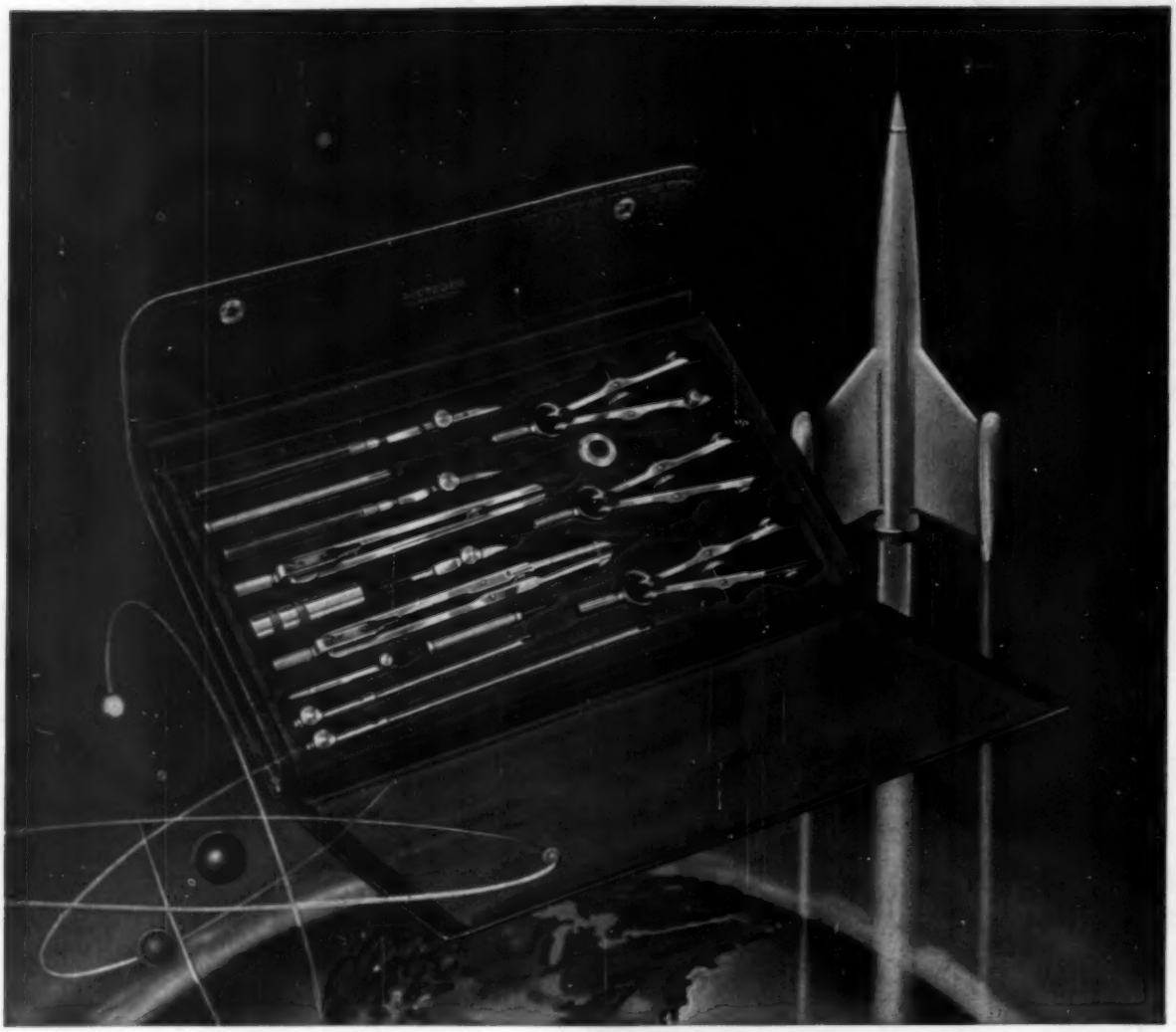
September, 1957 Vol. 46 No. 7

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

SCHOOL OPENING NUMBER



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Introduction to the back-geared screw-cutting lathe; indentification, function and operation of its parts. 16mm sound, full color. Time—20 min. *Free loan.*

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Teaches basic operations in between centers machining, etc. 16mm sound, full color. Time—20 min. *Free loan.*

FILM NO. 3—Grinding and Use of Basic Lathe Tool Cutter Bits

Shows grinding, adjustment and tool action for rough and finish turning, cutting-off and thread cutting. 16mm sound, full color. Time—20 min. *Free loan.*

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SEPTEMBER
1957

VOL. 46 NO. 7

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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☆ ☆ ☆

This Month's Cover

The photograph on the cover of this issue of the magazine shows Kent Ellwin, a graphic arts student at the Tucson, Ariz., High School, operating a platen press. The teacher is Orval Northam.

The picture was made by Louis Bradfield, a photographic student.

Photograph submitted by Harry A. Goldstein, APSA, graphic arts teacher at the Tucson High School.

☆ ☆ ☆

A Reminder

If you have not already done so, kindly notify the circulation department of The Bruce Publishing Company of your new address for the school year 1957–58. Failure to do that may cause you to lose one or more issues of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine.

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Articles Indexed.—The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

ANNUAL M.I.E.S. CONVENTION

The twenty-ninth annual convention of the Michigan Industrial Education Society was held at Grand Rapids, Mich., on April 11 to 13, 1957.

The chairman of the first general session, held at 8:00 p.m., on Thursday, April 11, was Roland R. Fraser. William B. Hawley was the first speaker and his topic was "The Area School, and its Potential in Industrial Education."

A panel consisting of Walter E. Sindlinger, Ernest Venk, Jon P. Adams, Earl L. Bedell, Maurice Pancost, and C. J. Freund then discussed the "History of Area Schools in Michigan."

Harold J. Van Westrienen gave a résumé of what had been presented.

Following this program, the movie "Automation," courtesy of the Ford Motor Company, was shown.

Thursday afternoon at 2:00, under the chairmanship of Richard C. Fell, the topic "Research in Action" was presented by Dr. Lawrence Borosage and Dr. Geo. Branden.

Some points brought out were similarities between vocational education and practical arts.

The areas subjected to research must be identified.

The people involved mean more than the specific things that are to be studied.

Increasing the effectiveness of engineering and management training is very necessary although this may be very difficult in many local communities. Educational directors need direction from employing groups and labor. Our instructional material must be prepared on the level of those whom we wish to teach.

How many technicians are needed and what must they be able to do? They may be men or women.

Research shows that they work with hand and machine tools. They must know how to use handbooks, and must know mathematics and science.

At the 8:00 p.m. Thursday session the "History of Area Schools" was presented. Immediately after this a movie, "Automation," was shown. This was presented with the courtesy of the Ford Motor Company.

At the Friday morning general session H. Edwin Rowley, president of the Michigan Industrial Education Society, conducted the annual business meeting.

After this meeting was over, Estell H. Curry gave an explanation of what was meant by "Brainstorming." He stated that it is a method of creating new ideas.

The entire audience was divided into groups of eight, and each was headed by a chairman and a recorder.

Such a group, for instance, chose the theme "Tool Storage." Leon Carpenter was appointed chairman. He took his eight men who wanted to discuss this subject to a table around which they could be comfortably seated. The chairman then announced that everyone should be prepared to make suggestions. He also appointed one of them as recorder, whose duty it was to put down the suggestions as they were made.

After a certain number of suggestions had been entered on the recorder's sheet a lively discussion started. The recorder was hardly able to keep up with the speakers. After approximately half an hour the discussions were stopped and the recorder was asked to read what he had written. These reports were then collected from the various groups and they will be mimeographed for distribution to the membership.

These are the rules for brainstorming:

1. It is a method for creating new ideas. The ideas may be good, bad, or indifferent; it doesn't matter.
2. Suggestions should follow one after the other. No one makes a speech.
3. Critical remarks of someone's suggestions are not tolerated.
4. Hitchhiking is legitimate; in other words, improve a previous idea.
5. Free wheeling is welcome — the wilder the idea, the better.
6. Quantity is wanted; see how many suggestions can be made in the time allotted.
7. Chairman should not allow any hilarity.
8. Recorder lists the suggestions as they are made.

A student teaching section was held in the afternoon on Friday. The young participants did an excellent job.

At the annual convention banquet Friday evening, Walter Scharmack was given the Master Teacher Award.

Charles R. Crakes, educational consultant, DeVry Technical Institute, Chicago, Ill., was the principal speaker. He pointed out that fifty per cent of our labor force are now

(Continued on page 6A)

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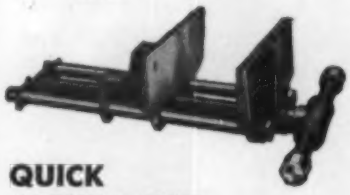

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SHOP INSTRUCTORS REPORT

CLAUSING

10" TILT/ARBOR SAW

OUTPERFORMS ALL OTHERS

Instructors in shops equipped with the new Clausing saw say it's way ahead in performance, capacity, and safety.

Typical of the reports is this one from Gilbert R. Hutchings, assistant professor, industrial arts department at Western Michigan University: "I have found the Clausing saw to be not only the best circular saw but the most for the money. My students show a strong preference for it — prefer using it to other makes in our shop. It's an unusually fine saw, with many features that I highly recommend for school shop use."

The new Clausing 10" is heavier throughout . . . built to handle up to 3 HP motors. It's unmatched for ease of operation and safety. When you compare you'll see that the Clausing is in a class by itself . . . the saw to consider before making any requisition or commitment.

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11 REASONS WHY
CLAUSING Leads All Others

- ★ Heavy-duty, 3 HP construction throughout
- ★ Three big table sizes . . . up to 54 3/8" x 27 1/2" . . . handles big stock with ease
- ★ Arbor, 3/4" dia. its entire length
- ★ Sealed-for-life ball bearings
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- ★ Double-locking lift-off fence . . . best in the industry
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- ★ Big, easy-turning blade controls
- ★ Large mitre gauge with keyed slide
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- ★ Cast-iron base

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ASSOCIATION NEWS

(Continued from page 4A)

making things that were never heard about 50 years ago. Forty two per cent of us do not live in the community where we were educated. Our older citizens do not live where they were born. Increasing numbers of workers are trained annually. School costs are not an expense; they are an investment. More scholarships must be made available. At least 50 per cent of our high school students should be trained in mathematics and science. Airplanes will fly at 3000 to 5000 miles per hour. Automation is merely another way of performing work. Workers must be trained to a higher type of work.

On Saturday morning one-hour demonstrations were given in six areas of shop work.

At 12:00 the convention luncheon and the Ship's program was held.

There were about 45 firms that exhibited at this convention, 717 paid registrations, and 1050 visitors and exhibitors.

EPSILON PI TAU — NU CHAPTER

New Brunswick, N. J.

The annual banquet and business meeting of the Epsilon Pi Tau Fraternity, Nu Chapter at Rutgers University on Friday evening, May 17, 1957, was marked by the presentation of two laureate awards, examination of 12 candidates and installation of new officers.

Richard Whitcomb, public relations director of Reactions Motors, Inc., Denville, N. J., addressed the dinner group on the subject, "Exploring Space," A Journey into Tomorrow.

Arthur Wrigley, State Supervisor of Trades and Industry, Vocational Division, and Owen Kiser, sponsor, presented the laureate awards to Robert Kessler and posthumously to Winifred Vaughn (Mr. Vaughn had been chosen for the honor before his untimely death).

The apprentices honored at this dinner will be initiated in October. They are Arthur H. Denzler, Robert G. Donald, Louis Hamara, George B. Howland, J. Arthur Lewis, Walter J. Macak, Adam W. Martin, Edward Nugent, Earl F. Mosier, George B. O'Conner, Charles Offenheiser, J. Norman Parris, and Fred Steingrass.

Henry Albrecht, nomination chairman, announced the election of the following officers for 1957–58: Carl T. Moran, president; Kenneth Charlesworth, vice-president; William O'Reilly, secretary; and Howard L. Barrett, treasurer.

George Morgenroth, past president, thanked the members for their wonderful support and co-operation during his tenure of office.

George W. Lang, program chairman, arranged the successful dinner. — *Charles F. Green,* Public Relations.

EPSILON PI TAU

Beta Field Chapter of Epsilon Pi Tau fraternity at San Diego, Calif., held its second annual Epsilon Pi Tau Principals Breakfast on the patio of Scripps Cottage, San Diego State College, San Diego, Calif., on April 27, 1957.

The Beta-Alpha Chapter of San Diego State College were guests, and the members were given an opportunity to meet the secondary school principals of their area.

Dr. James Hunter, executive dean of San Diego State College, addressed the group on the topic, "The Growth of Our College."

Officers for the 1956–57 season are: president — Walter P. Busch; vice-president — Bergman Crawford; secretary — Kenneth Thomas; treasurer — Merrill McLaughlin; trustee — William Steinberg; and co-trustee — Dr. Kenneth Phillips. — *Walter P. Busch,* president.

RALPH CHARNEY IS HONORED

A formal initiation of Psi Chapter of Epsilon Pi Tau was held on Saturday, April 6, 1957, at Uniontown, Pa.

Ralph Charney, a faculty trustee, was made a laureate member of the fraternity. Mr. Charney was a charter member of Psi Chapter. The award was presented by Anthony Stavaski, Chapter Founder.

The main address was delivered by Delmar W. Olson, professor of industrial arts at Kent State University, Kent, Ohio, where he is a faculty trustee of Epsilon Pi Tau.

The group receiving the formal initiation at the banquet includes the following students: James DeBolt, Rodger Hammond, H. Carl McGary, Allan Myers, Paul Querry, and Frederick Randolph. Also initiated was Richard G. Flick, an alumni and directing teacher in the general metal shop at Somerset Joint High School.

TWENTY-FIRST ANNUAL CONVENTION OF WAVAE

The Wisconsin Association for Vocational and Adult Education conducted its twenty-first annual convention on May 2, 3, and 4, 1957, at Hotel Loraine, Madison, Wis.

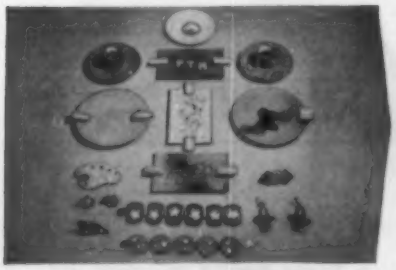
The Wisconsin Association of Directors of Vocational and Adult Education met on Thursday, May 2. The chairman was R. W. Bardwell, director, Madison Vocational and Adult School.

The first general meeting opened on Friday, May 3, at 9:15 a.m. Jacob Spies, president, was chairman and the speaker — Dr. R. C. Scottie Young, director of admissions, Atlanta Division, University of Georgia — addressed

(Continued on page 12A)

Now...a new, easy method for COPPER ENAMELING

The PREST-O-LITE Air-Acetylene Torch, which supplies a flame temperature of 4,000 deg. F., is the ideal tool for enameled copper projects. In using a PREST-O-LITE Torch, students:



1. learn a new valuable skill in torch handling.
2. SEE the enameling process as it takes place.
3. manipulate and artistically treat parts with greater facility.
4. perform fast controlled heating with no "warm-up" time.
5. solder on fittings with the same torch equipment.
6. join standard shapes to create artistic pieces.

Torch equipment required for copper enameling need never be idle. It is equally useful for silver-soldering and brazing, for all soft-soldering work, and for the hundreds of everyday heating jobs required in the school metalworking shop.

Mail coupon for a free copy of booklet telling how to do copper enameling by the new, easy air-acetylene torch method.

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Grinding a slender shaft, one of the many straight and taper grinding operations performed on CINCINNATI FILMATIC 10" Universal Grinders. These machines, built primarily for industry but possessing all the requirements for vocational school equipment, swing 10" diameter over the table, and take 24" length between centers.

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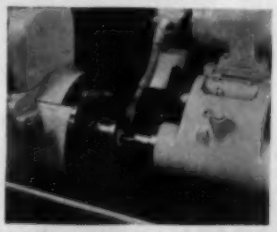

Internal grinding. The internal grinding head is permanently hinge mounted; does not interfere with other setups.

Face grinding. For this type of setup the headstock is swiveled 90°. The chuck is standard equipment.

Every school shop needs versatile equipment. And for instructions in precision grinding, no other machine equals the versatility of CINCINNATI® FILMATIC Universal Grinders. Here are some of the setups your students can perform:

External cylindrical grinding, straight and taper
Internal grinding, straight and taper
Face grinding
Shoulder grinding (with "double shaft" motor).

In addition to the advantage of versatility (a basic requirement for instructions in modern grinding techniques) CINCINNATI FILMATIC Universal Grinders are exceptionally durable. For example: grinding wheel spindle bearings are Cincinnati's exclusive FILMATIC type, never require adjustment, never wear out... lubrication is principally automatic, with filtered oil... castings are made in Cincinnati's own foundry from selected grades of iron. Would you like to know more about these fine machines? You will probably be most interested in the 10" size. Write for your copy of catalog No. G-577-6.

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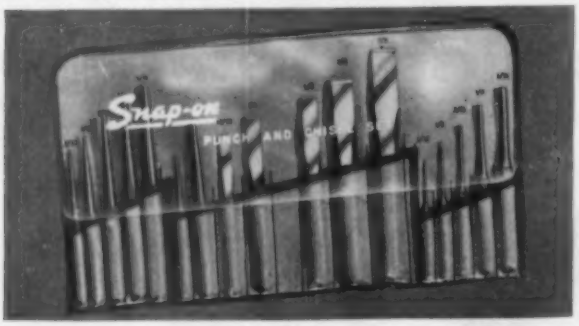
Snap-on set No. PC-170-K contains five starter punches and five drift punches, 3/32 to 5/16 in.; five chisels, 13/32 to 7/8 in.; and two center punches.



This new Snap-on CHISEL and PUNCH SET helps students work safely

With this *Snap-on* set in the shop, students have a selection which helps them learn that the right size chisel, starter or drift punch does better work and promotes safe workmanship.

Snap-on has gone all out to provide the greatest possible safety factor in the design and manufacture of the PC-170-K set. The use of special tough alloy steels, the easy-gripping octo-square shape of the shank, the special heat treatment that provides hard punching and cutting tips and softer striking heads for controlled mushrooming—all contribute to safer working conditions.

However, no matter how well a tool is made, certain precautions should be taken in its use. Follow these hints for the safe use of chisels and punches in your school shops:

1. Always wear safety glasses when chipping, cutting or shearing.
2. Keep chisel edges filed sharp and in good cutting condition. If you do grind the tips, be careful that temper is not destroyed by overheating.
3. Keep mushroomed heads ground smooth so small particles won't fly off when struck.

Valuable new wall chart FREE

You can have all these safety tips, and others, on the use and care of punches and chisels. Just write for your copy of the new large Snap-on training chart. Mounts on the wall for ready reference. It's yours free — just for the asking.

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OLIVER 6-inch Jointer is machined to give smoothest work and many extra years of service

The Oliver 6-inch Jointer is ideal for all classes of small work found in school shops. The sturdy, rigid one-piece frame of this heavy-type Jointer carries tables, cutterhead, motor, fence and guard. Tables are raised and lowered by hand knobs and screw. Fence, adjustable across table, can be tilted up to 45°. Has three-knife circular safety cylinder. Write for Bulletin No. 133.

OLIVER MACHINES FOR SCHOOL SHOPS

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Circular Saws	Mortisers	Speed Lathes	Wood Trimmers
Borers	Planers	Tenoner	Tool Grinders
Jig Saw	Shapers		

Oliver makes an 8-inch heavy-type Jointer, and others up to 30 inches.

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Perfect for the school shop

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A Queen City pedestal or bench Grinder is a wise choice for the school shop. It has the features and performance of industrial grinders: repulsion-induction motor, fully enclosed; rugged bearings and guards; high quality switches and cords ... yet the price is 20 to 30% less!

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Now your students can do beading, grooving, routing, fluting, inlay work—a flock of jobs—faster with the easier-handling new Black & Decker 1 HP Heavy-Duty Router! Here's a maximum of power packed into a minimum of weight—a tool that sets new standards of precision—perfect for fast finishing. And a clearly illustrated manual is included with each tool for project ideas and helpful operation tips.

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THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT

THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/8". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

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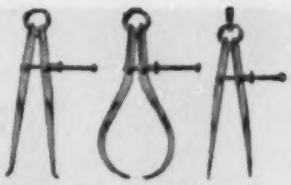
Priced to Fit School Shop Budgets

These tools are basic in any well-equipped school shop. They won't put a bulge in your budget but they will give your boys the invaluable experience of working with genuine Starrett Tools. For other Starrett Tools recommended for school shop use, see new Starrett Catalog No. 27.

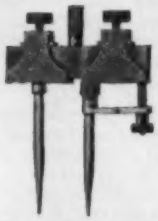


STARRETT "YANKEE" CALIPERS AND DIVIDERS
No. 73 No. 79 No. 83

Spring-type, side-adjusting inside and outside calipers and dividers made of high grade steel — strong, durable, well finished. Many other types available.

NO. 436 0-1" SATIN CHROME MICROMETER

Ruggedly built with new tapered frame plus no-glare, rust and stain resisting Satin Chrome Finish on sleeve and thimble, easy-to-clean black enameled frame, quick-reading figures, decimal equivalents on thimble.

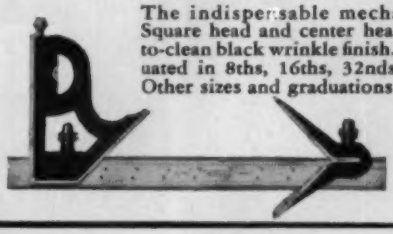


NO. 50A IMPROVED TRAMMELS

Make your own beam of any length for these improved trammel heads. Two heads furnished (one fine-adjusting) plus socket for replacing either steel point with pencil. Use with any 3/8" x 3/4" beam.

NO. 11 12" COMBINATION SQUARE

The indispensable mechanics' tool. Square head and center head have easy-to-clean black wrinkle finish. Blade graduated in 8ths, 16ths, 32nds and 64ths. Other sizes and graduations available.



NO. 129 BENCH BLOCK

An excellent bench block and light anvil for heading, drilling, pin driving, etc. Hardened and ground to smooth finish with knurled side grip. Holes range from 1/8 to 5/8 inches. Size: 3" diameter by 1-1/2" high.

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One of a wide choice of types and leaf combinations. Made of the finest steel ground velvet smooth. Nine 1/2" x 3-1/16" leaves from .0015" to .015". Locking devices secure blades in any position. Straight or tapered leaves (shown).

NO. 20 HARDENED STEEL SQUARE

A precision square with beam and blade hardened and ground to insure parallelism and straightness. Blade sizes from 1-1/2" to 36".

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New Bulletin 1203, "How to Read, Use Care for Micrometers and Vernier Gages." Also, "Training Aids Bulletin No. 1202" which shows many Starrett training aids available free or at small cost.

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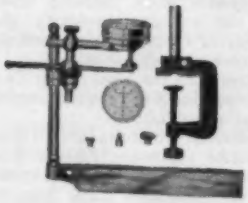
Describes the complete line including many tools priced to fit school shop budgets. Write for your free copies. Address Dept. CE, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.

NO. 196A UNIVERSAL DIAL TEST INDICATOR



Ideal for teaching setup and inspection methods. Easy to set up, read and use, standard attachments provide for universal use on machine tool posts, arbors, face plates, surface gage spindle, etc. Graduated .001", reads 0–10, range 0–.002".

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☐ BUFFET STORAGE CABINET	☐ BOAT BED	☐ 5' SAILER
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☐ TOOL-CABINET WORKBENCH	☐ COVERED SAND BOX	☐ 20' SAILBOAT
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☐ BEDSIDE TABLE	☐ SECTIONAL PATIO TABLES	☐ 7'9" PRAM DINGHY
☐ STUDENT'S DESK	☐ OUTDOOR SERVING WAGON	☐ 13'4" OUTBOARD
☐ CHEST OF DRAWERS		☐ 13'6" INBOARD RUNABOUT
☐ TWO-DOOR CABINET	☐ SUN SLED	☐ HOG HOUSE
☐ TV STOOLS	☐ GARAGE STORAGE BOX	☐ POULTRY HOUSE
☐ CHILD'S TUMBLER	☐ GARDEN CABINET	☐ ROLL-AWAY POULTRY NEST

DOUGLAS FIR PLYWOOD ASSOCIATION, DEPT. IA, TACOMA 2, WASH.

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ASSOCIATION NEWS

(Continued from page 6A)

his audience on the subject "Education for Tomorrow."

The main speaker at the banquet meeting on Friday was Edward McFaul, Chicago, Ill., who spoke on "So You Think You Are Slipping."

The annual business session was conducted at 9:00 a.m., Saturday with President Jacob Spies presiding.

C. L. Greiber, director, State Board of Vocational & Adult Education, Madison, spoke on the topic "The Outlook for Vocational & Adult Education."

Sectional meetings were conducted on Friday, May 3, for various groups including secretaries and office workers; trade and industry, co-ordination, and circuit teachers; homemaking; general subjects; rehabilitation; distributive education; guidance; business education; practical nurse training; drivers training; radio, television, electricity; heat engine trades; general building and allied trades; graphic arts; general metals and allied trades; and barbering.

CENTRAL CONNECTICUT INDUSTRIAL ARTS ASSOCIATION

The final meeting of the 1956–57 school year was held at the King Philip Drive School at West Hartford, Conn., on Wednesday, May 8, 1957. Members toured the school with special interest in the shops. The regular meeting included the usual reports and also that of the nomination committee.

Officers elected for the forthcoming year are as follows: president — Russell H. Anderson, Torrington; vice-president — Cesidio Sylvestro, East Hartford; secretary — Willard Davis, Hartford; treasurer — Donald Fisher, Windsor. Jack Crowe of Waterbury was elected representative to the State Industrial Arts Organization.

The program consisted of a large and varied display of teaching aids and shop kinks and a discussion of their merits and uses by the contributors. The program was under the direction of Don Hubert, program chairman, and Robert Brady and Nicholas Battit of the King Philip School staff.

The appreciation of the organization was extended to the outgoing officers headed by Harry Arnini of West Hartford, who served as president. Special note was made of the rise in membership and attendance figures during the past year. — *Russell H. Anderson*, former secretary.

THIRD ANNUAL PROJECT FAIR

The New Hampshire Industrial Education Association held its third annual project fair at Laconia, New Hampshire, on May 10 and 11, 1957.

Over 450 projects were exhibited in the areas of arts and crafts, auto mechanics, radio, machine shop, general metal, printing, sheet metal, general shop, building trades, woodworking, silk screening, electricity, plastics, cabinetmaking, cosmetology, technical drafting, and cooking and baking.

In co-operation with the Ford Motor Company 75 pins and certificates were awarded to the outstanding exhibitors.

The fair committee chairmen are: Andrew Moynihan, general chairman; Charles Lord, local arrangements; Frank Tisdale and Spencer Eaton, rules for judging; John Nay and Herman Caswell, publicity; William Volkman, George Taylor, and Raymond Pelletier, printing; Robert Ingalls, program; Alton Perham and Wesley Adams, prizes; and Charles Beard, Ford Industrial Arts Awards. — *John B. Nay.*

(Continued on page 20A)

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Model 90 12" Lathe

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- SWING 12" (STRAIGHT BED), 17" (GAP BED); 37" BETWEEN CENTERS 60" BED
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You may select Plain or Dog Type front jaws. You may specify Hardwood, Tubular Steel or Adjustable Steel Handles. Write for Bulletin LL-3184. AA-0204

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foundries all over the world use Sterling Rolled Steel Channel Flasks... *The new Sterling Catalog tells you why. Write for your copy.*

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Model 1055 Drawing or Art Table
Size of top, 42 x 30 x 1¼ in. Height of work surface, 41¼ in. at back, 37 in. at front. Legs and braces are of anodized satin-finish, heavy extruded aluminum tubing. Top is close-grained laminated hardwood with a metal U channel flush mounted at each end. Drawing board cabinets are of all-welded steel with box flange construction. They have built-in separators for storing 12 drawing boards. Model 242 stool is shown with units.

Here is a new concept in furniture for mechanical drawing and art classes

—you can have as many classes as you want without buying expensive 6-class tables

SPS has developed an entirely new concept in furniture for mechanical drawing and art classes—a combination of drawing tables, drawer and drawing board storage units which permits great versatility in number of classes without buying extra tables.

HERE'S HOW IT WORKS

A student is assigned a drawer and a drawing board at the start of a semester. These are stored in the service unit. At the start of each class, the student removes his drawer and his drawing board and carries them to his drawing table. At the end of each class, he returns both items to the service unit. The table at which he was working is then ready for the next class.

HERE ARE ITS ADVANTAGES

Only one drawer and one drawing board are at a table at any time. No drawer tiers and drawing board storage units are hung from the underside of the table to limit leg room. Classrooms are neater. There is no clutter under the table.

Less possibility of pilfering or tampering with drawers and their contents. The individual student has his own drawer and drawing board safely stored in the service unit.

Schools with 2, 3 or 4 classes per day need not buy expensive 6-class tables. Schools with six classes per day need not buy extra 6-class tables for night classes. All they do in either case is determine the number of classes per table and buy service units to meet present and future requirements.

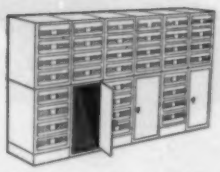
This furniture for mechanical drawing and art classes is just one element in the complete HALLOWELL School Shop Furniture line. See our Catalog 2112 for all units. Write for your copy today. HALLOWELL Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 74, Pa.

STANDARD PRESSED STEEL CO.

HALLOWELL® SHOP EQUIPMENT DIVISION SPS

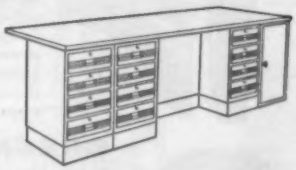
JENKINTOWN PENNSYLVANIA

TYPICAL ARRANGEMENTS OF HALLOWELL SERVICE UNITS



2-high section of service units. Has 36 drawers, holds 36 boards.

Wall reference table—6 drawer units, 2 drawing board units hold 24 boards.



Planning table—3 drawer units, 1 drawing board unit for 12 boards.

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ASSURED QUALITY

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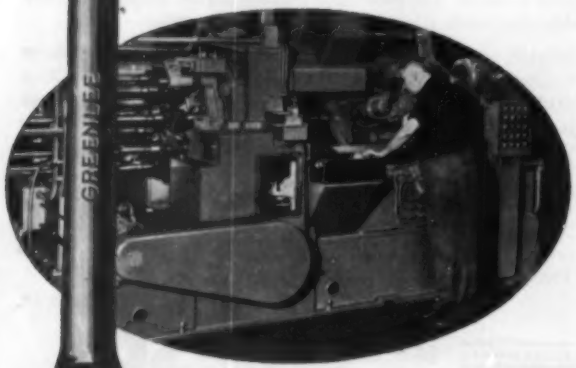
The craftsman who *really* knows tools can instantly see the *extra* quality in a GREENLEE 22 Solid-Center Auger Bit.

And when he puts these fine bits to work, he is assured better results, for all GREENLEE 22 Bits are of uniform high quality. In their manufacture all cutting parts, point, throat, and twist are *automatically milled* on a battery of precision machines. Cutting edges are true . . . screw points are accurate . . . squares are perfect . . . shanks never vary.

These are the quality features you want in your bits to assure good, clean workmanship every time. Be sure you get them, by asking for genuine GREENLEE 22 Solid-Center Auger Bits . . . at hardware and building supply dealers throughout the country.

Automatically producing Greenlee 22 Solid-Center Auger Bits on a special Greenlee bit-making machine for assured uniformity and quality.



HANDY WOODWORKING CALCULATOR . . . ONLY 25c

Converts linear to board feet, gives nail specifications, tool-sharpening tips. Compares woods, gives bit sizes for screws, concrete mixes, painting information, etc. Simple to read, 6" circular shape. Send 25c (no stamps, please).

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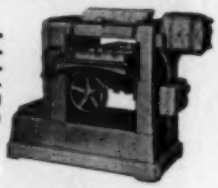
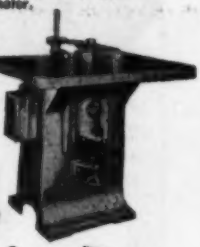


NO. 2 SURFACER—new, streamlined machine. Features simplified, mechanical design. Takes material 18" wide and from ⅛" to 8" thick.

HAND JOINTER—compact and accessible. Built in 8" and 12" width. Table 6'2" long, maximum rabbet depth 9/16". Round, 3 knife safety type cylinder head, 3 HP 3600 RPM motor.

SHAPER—1" diameter spindle, with 4½" vertical adjustment, 36" x 26" table, spindle speed—8,500 RPM, floor space—34" x 37".

BAND SAWS—machine 20" diameter wheel illustrated. Floor space 24" x 36", horizontal capacity 20", vertical capacity under guide 11". Also 27", 32", and 36" machines available.



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15-minute sound movie dramatizes advantages of dust control in the school shop

Here's an informative film especially made for showings to school boards, parent-teacher associations, school planning groups, school architects and engineers, vocational education departments, and industrial education groups. It graphically illustrates the importance of school shop dust control.

See a picture story on proper exhaust hooding . . . see "before" and "after" sequences showing how adequate dust control reduces fire hazards, cuts housekeeping costs and improves safety . . . see actual class projects at Brookfield High School, Brookfield, Wisconsin.

This film is available for use by any group at no cost except return postage. For a showing to your group, write or phone Mr. Robert D. Moore, American Air Filter Company, 2nd and Central, Louisville 8, Kentucky.

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
SEPTEMBER 1957

Survival or Annihilation

THOMAS A. HIPPAKA
Iowa State College
Ames, Iowa

Another world conflagration had ended for a vast contingent of our untimely dead. John McCrae had paid an everlasting tribute to our soldier dead with these immortal lines:

> In Flanders Fields the poppies blow
> Between the crosses, row on row,
> That mark our place; and in the sky
> The larks, still bravely singing, fly
> Scarce heard amid the guns below.
>
> We are the dead. Short days ago
> We lived, felt dawn, saw sunset glow,
> Loved and were loved, and now we lie
> in Flanders Fields.
>
> Take up our quarrel with the foe;
> To you from falling hands we throw
> The torch; be yours to hold it high.
> If ye break faith with us who die
> We shall not sleep, though poppies grow
> in Flanders Fields.

These beautiful, but tragic lines must forever remain a living ultimatum to us from our honored dead. Our soldier dead have decreed that we "take up our quarrel with the foe" and complete the task for which they made the supreme sacrifice. They implore us to hold high the torch which they bequeathed to us from falling hands.

If we are to hold high the torch entrusted to us by John McCrae and his fellow dead, we must dedicate ourselves to the use of mature methods, as we pursue the quarrel with our foe. Man's reasoning ability must replace military strength in the settlement of world problems, if humanity expects to survive.

Man's Precarious Dilemma

Literally, the incalculable power of man's diabolical instruments of destruction has outmoded war for all times as a means of saving the world. Their use can lead to only one conclusion; the annihilation of man himself. The irony of it all is that the leading nations of the world are constantly adding to their stock piles of deadly nuclear weapons in a so-called mad race for supremacy when they already have sufficient fire power to destroy the world.

Mankind's fear of modern military weapons is explainable. Sir Winston Churchill was prompted to conclude that the hydrogen bomb was the greatest single deterrent to war. The very contemplation of its use brings fear to the hearts of men, as it truly should, for it heralds man's annihilation.

Man's abstinence from the use of nuclear arms must be based upon a deep-seated code of morals, and not fear. So dangerous have the instruments of war become, that only morally responsible people can save the world. Right must make might, if the world is to escape annihilation. It naturally follows that America must constantly watch her morals. She needs to be morally right in the eyes of humanity if she is going to provide the world leadership which is expected of her.

Basically, the global struggle is being waged by two world powers with vastly different ideologies. One guarantees freedom for its citizens, while the other inflicts slavery upon its people. In one, the government is "of the people, by the people, and for the people." In the other, everything and everybody is for the state; the state is supreme; the inhabitants, merely pawns of a ruthless dictatorship. The struggle will persist for decades even if we continue to avert a nuclear war, with the United States and the Soviet Union as the chief proponents of the two conflicting ideologies. The preservation of the democratic way of life will depend upon the untiring efforts of informed, responsible, and courageous individuals.

In the words of Christopher Morley: "The man about town must become the man about the planet."

Any war must be kept a cold one if war we must. The battle for the minds of men will continue for years, even if we can avert a hydrogen-bomb war, with Communism and Democracy as the chief ideologies in immediate and continuous involvement.

As we pursue the establishment of peace through reason, we are faced with a world dilemma characterized by force hitherto unknown to man. Donald Robinson gives us a hideous, but timely picture of what could very well happen within a few short years at the most.

> This could be the way Moscow dies, says Robinson: A flash alerts the Pentagon: "Russians attacking NATO Nations." At once, a code signal goes to a secret launching platform near the

Canadian border, and a blue-clad United States Air Force officer pushes a button. Instantly, an intercontinental ballistic missile — the deadliest, most destructive weapon ever conceived by man — is sizzling into the sky.

Spurting flames, the missile streaks up beyond the earth's atmosphere to the never-never land of empty space. Then, at four miles a second, 20 times the speed of sound, it hurtles toward Northwest Russia, 5000 miles away. In just 20 minutes, it's there, smashing its hydrogen-bomb warhead into the heart of Moscow.

After that there's nothing left of the Russian capital except bits of radioactive rubble and shreds of torn human flesh.

This also could be the way New York dies and every other major city in the United States.

Obviously this is not the way "to take up our quarrel with the foe." This is not the means by which to carry the torch entrusted to us. Nobody can win with such an approach.

Secretary of the Air Force, Donald A. Quarles, informs us that the intercontinental missile is now in the blueprint stage. Secretary of Defense, Charles E. Wilson, predicts that the missile will become a reality in 1961. This rocket, built at a cost of $5,000,000, will be approximately 100 feet long and 15 feet in diameter. Experts predict that it will be capable of speeds from 12,000 to 15,000 miles per hour. Its maximum range will be in the neighborhood of 6000 miles, capable of achieving altitudes of over 246 miles. And when it strikes it hits its target with a force of 200 atomic bombs. Experts tell us that the next world war will be settled within 30 minutes after it starts.

Inventiveness in this atomic age is not to be denied. Walt Whitman's words were never truer than they are today when years ago he wrote:

We detachments steady throwing
Down the edges, through the passes,
up the mountains steep,
Conquering, holding, daring
venturing as we go the unknown ways.
Pioneers, O Pioneers!

Feverishly we have created such heathenish instruments of destruction that we are now quite capable of destroying the world. Added to the atomic bomb, the hydrogen bomb and the guided missile, is the jet-engined plane, capable of developing 25,000 horsepower and flying at a speed of 1500 miles an hour. The sound barrier has been licked; the heat barrier is to be mastered, next. Unmanned aircraft do their own navigating by the stars. Radar is in common use. Atom-powered submarines have become a reality. Nuclear-powered aircraft are practically assured. The era of push-button warfare, too hideous to contemplate, is here. Human annihilation will be swift and certain, should the world make the awesome error of turning these weapons upon itself. General Curtis LeMay, head of the Strategic Air Command, makes peace through reason appear even more imperative when he informs us that the two greatest world powers, Russia and the United States, have now arrived at a virtual thermo-nuclear deadlock.

We have lived for too long a time in an age ironically predicted by these words found on a tombstone 500 years old in a cemetery of Church Comsie, Essex, England:

When pictures look alive with moments free,
When ships like fishes swim below the sea,
When men outstripping birds can scan the sky,
Then half the world deep drenched in blood shall be.

Technical and scientific pioneering will go on, "conquering, holding, daring, and venturing." Ironically enough, this too will cease when men through fear, a mania for conquest, an unwillingness to negotiate, immaturity, a superiority complex in weapons or the resorting to war as a means of unifying their people become "trigger happy" and blow the world to bits. Singly, Russia or America now possess sufficient weapons to do this. As man through his perseverance and intelligence discovers that which his Maker left him, he must turn these blessings into instruments of peace for the benefit of all mankind.

So crucial is our search for peace with honor that Nehru was prompted to say: "Peace has become a test for human survival."

World War III means man's catastrophic annihilation. Whether we have war or an honorable peace will be determined by each of us who are alive today. No problem of such colossal dimensions will solve itself; we must ultimately solve it.

The Choice: A Strengthened United Nations or the Hydrogen Bomb

Considering the matter of survival or annihilation in terms of possible alternatives, we could very well say that our choice is between an improved United Nations approach or a hydrogen-bomb war.

The United Nations is no better than we as human beings are willing to make it; of itself it can do nothing. Its implementation is the responsibility of all of us. It constitutes an approach where reasoning is paramount in the settlement of differences between nations. There are wholesome signs that the world is finally moving in this direction.

Any democratic approach to the solution of world problems naturally brings forth human frailties as well as prejudices. Although its activities are colored by human inadequacies, the United Nations concept cannot be totally condemned upon such a basis. It has become the sounding board of the world, and as such, it brings forth the bad as well as the good in humanity. Democratic processes are time consuming, argumentative, as well as involved, and may even be characterized by intolerance, prejudice, hard feelings and confusion, before reasonable agreements are reached. Progress comes slowly and painfully, all of which constitutes the price we pay when pursuing democratic methods.

The initial employment of any democratic instrument of government is generally accompanied by serious and unwarranted difficulty. In fact, its acceptance often comes only after prolonged controversy and turmoil. It could very well be said that the United Nations is no exception; it too must prove itself and gain its acceptance in the eyes of civilization. We need to be reminded that even Benjamin Franklin was accosted by an angry critic as he came forth from the portals of Independence Hall after he had attached his signature to the Constitution of the United States.

A very much perturbed woman burst forth with this pointed question: "What kind of a government have you given us?"

The great statesman's classical reply was: "We have given you a Republic, if you can keep it."

The end of an epoch may well have been marked by concerted global protest to the crises in the Middle East and Hungary. Through the United Nations, world opinion has expressed itself in no uncertain terms with dispatch and unprecedented effectiveness.

Richard Lowenthal of the London, England, *Observer* staff makes this encouraging observation:

> . . . 1956 may well come to appear in retrospect as the year when the West, for all its weaknesses, mistakes and internal divisions, at last wrested the initiative in world affairs from the Soviet bloc.

In the Suez situation the United Nations played a very vital role. A resolution critical of France and the United Kingdom forced these two Christian nations to reverse their procedures due to public opinion, which rapidly formed in the councils of the world organization.

For the first time in human history, a goodly majority of the nations of the world condemned a single nation, Russia, for her wanton butchery of the

inhabitants of another country, Hungary. Even the Asiatic and the African nations could not see their way clear to uphold the Soviet Union. The world, including Russia, will not forget the vote of 55 countries in this significant United Nations action. Russia stood alone in her guilt before the bar of world opinion. This in itself constitutes an event of some magnitude, even though Russia would have the world believe that her brutality in Hungary was incidental to the management of the internal affairs of the country.

The Suez crisis brought into being a United Nations police force officially recognized as such. While it is true that it exists on a token basis, it now constitutes an approved arm of the world organization. Its significance is also noteworthy in that the present police force is composed of soldiers from the smaller countries. The weaker nations are finally coming into their own. It could very well be that the world has finally become convinced that peace cannot be secured by throwing small nations to the wolves.

Whenever public opinion is allowed to crystallize, it becomes a power that cannot be denied. Free nations, everywhere, recognize this as never before, and they are making it their chief weapon for freeing the world of the tyranny too long imposed upon peace-loving people by brutal dictators. The United Nations has become a center of world public opinion. Any tyrant who thinks that he can forever prevent the crystallization of public opinion and its grievous consequences to him, is playing a losing game.

Russia needs only to listen to Dr. Victor Belaunde of Peru who uttered these significant words:

> . . . We must tell the Soviet Union to take care because the public opinion of the world is similar to radioactive neutrons and protons — it penetrates everything. . . . It will fly over the Iron Curtain and reach the hearts of the Russian workers and students.

On December 18, 1956, Japan became a member of the United Nations, on which occasion, foreign minister, Mamoru Shigemitsu, told an applauding audience:

> The people of Japan desire peace for all time and are deeply conscious of the high ideals controlling human relationships.
>
> We desire to occupy an honored place in an international society striving for the preservation of peace, and the banishment of tyranny and slavery, oppression and intolerance for all time from the earth.

Japan has come a long way since her surprise attack at Pearl Harbor.

We now have a United Nations made up of eighty world powers. It can no longer be denied in its varied efforts on behalf of humanity. It must never be allowed to become another League of Nations.

The Kremlin's Losing Tactics

Once more, Russian savagery has been exposed for the whole world to see, this time by the liberty-loving Hungarians. The total disregard for human welfare, as well as life itself on the part of the Soviets has reached unprecedented proportions, and their crimes are becoming better known throughout the world, as they persist in committing them. The men in the Kremlin know that they are playing a losing game as they continue to practice their brutality.

Edward Crankshaw pointedly indicates:

> As far as the Soviet Union is concerned, the events of the past two months have added up to far more than a setback; they have achieved the total destruction of a line of policy which has served the Kremlin well for decades and by which the Soviet leadership has consistently orientated its major decisions since the time of Lenin.

Even Marshal Tito, who wants his own particular brand of communism for his country, showed his concern over Hungary in these words:

> The Soviet rulers unfortunately still believe that military strength settles everything. But such is not the case.

To deal with Russia, is to remember our past experiences with her, and an editorial in the *Wall Street Journal* would help us in this regard:

> The Soviets emerged as the greatest victors of World War II because they successfully duped the world into thinking of them as the great peace-loving foes of Fascism. In the cold war they have worked hard to keep the decent regard of a very large part of mankind even while their deeds were contemptuous of decency.

While we maintain a superb, well-armed military force, we will continue to prove not only to Russia, but to the rest of the world, that we desire to employ methods of peace in our negotiations with all peoples of the world. Constantly our aim will be an honorable peace, as we patiently promote the concept that war settles nothing, and that no nation can win a war, more especially, a nuclear one. We shall trust Russia only when she proves herself trustworthy.

President Eisenhower has clearly issued this ultimatum to the Kremlin:

> The American people want to be friends with the Soviet peoples. There are no natural differences between our peoples or nations. . . . It is time that all curtains, whether of guns or laws or regulations, should begin to come down. But this can only be done in an atmosphere of mutual respect.

The Universal Urge for Freedom

Imperialism, with all its trappings, is dead. People desperately want to be free, to live their own lives, to rule themselves as they wish, and to utilize their natural resources for their own comfort and general advancement. People in ever increasing numbers throughout the world are dedicating themselves to the principles of freedom, its establishment and preservation, not only for themselves, but for others. We are beginning to realize that the world cannot exist half free and half slave.

The urge for freedom in the minds and hearts of men today is not only just as intense as it was in the days of our early American colonists, but it has now reached all corners of the world, with one marked difference. As peoples struggle to preserve hard won freedoms today, they have a problem which our early colonists did not have. Theirs is the ever present threat of Communism, an ideology that constantly stalks its prey. Wherever peoples have gained their freedom during the present century, Communism has been a very real menace to their freedom, and too often, embryo nations have succumbed to it. When peoples, through superhuman suffering succeed in casting off their yokes of colonialism, it becomes the moral responsibility of all Christian nations to assist them in escaping the chains of Communism.

Not only do millions of people want their freedom, but they desire to improve their living conditions as well. These downtrodden races have seen other peoples secure such blessings for themselves; they insist that they shall have them too. What is more, they long to employ their natural resources in this effort without undue interference from other nations. They welcome technical assistance from the more advanced countries, and the United States of America has been quite generous in this respect. Possibly such signs of the times led Dr. Arnold J. Toynbee to opine that our age is the first since human history began that dares to think in terms of making the benefits of man's efforts available to all of humanity. He further indicates that the present century will be largely remembered for such accomplishments, and not for the countless gadgets created by man.

Peaceful Weapons

While superior military strength in the hands of disciplined Christian nations constitutes a vital asset to world peace, humanity is gradually learning that there are other weapons of equal,

if not greater force than military might. Public opinion has long been recognized as one of these.

Henry Cabot Lodge, Jr., identified another when he spoke these words in the United Nations General Assembly:

> If we here feel sometimes that our patience is exhausted, just think of the ordeal of the workers and the peasants of Hungary whose courage alone sustained them. They have not submitted. And it is one of the proudest chapters in the history of the human race that they have not. On the contrary, they continue to employ the unbeatable weapon of passive resistance, a weapon which the representative of India reminded us the other day is mightier than guns.

The world has never known a time when intelligent and courageous diplomacy loomed larger than it does today. There is no denying the crying need for realistic diplomacy and its imperativeness as an instrument of peace. Diplomacy, at its best, can and must replace war in a world that has become a virtual powder keg of nuclear dimensions.

Vice-Admiral Daniel E. Barbey has given us a timely warning:

> This is a moment when any unfortunate act, any slip by a trigger-happy guard or an overzealous officer, can set off cataclysm. If we would not sacrifice the last slim chance for peace, we must not do anything which possibly could upset the most delicate of balances.

Diplomats from the civilized nations are doing everything in their power to prevent the cold war with its "brush fires" from becoming an all-out world conflagration. In fact, they are breaking their "diplomatic necks" to secure peace. On the other hand, let us be certain that whenever nations refuse to recognize our forthrightness, they will be compelled to respect our military strength and to govern themselves accordingly.

Secretary of State, John Foster Dulles, would have us realize this stark truth:

> A miscalculation in the Kremlin could plunge the world into a war.

The battle for men's minds has become world wide. We must "take up our quarrel with the foe" in an arena of ideas and ideologies. Wars settle nothing; in fact, they complicate matters. When men resort to war in order to settle their differences, they admit that they have failed as rational human beings.

President Eisenhower's analysis is crystal clear:

> The forces of freedom and the forces of tyranny are met in a struggle in which the battlefields are indeed the minds and souls of men.

If we are to hold high the torch relinquished to us by our honored dead, we must believe with Milton, that the truth will eventually prevail where it is allowed to grapple with falsehood. We have demonstrated that we can put a gadget into every home; now we must prove that we can sell fair play and justice to the whole world. We must have faith that goodness will ultimately triumph; that the collapse of the Kremlin cannot be ruled out as a possibility. Meanwhile, the truth must be publicized continuously with vigor, intelligence, and persistence. Only the educated in possession of these strengths will ultimately win the battle for men's minds. The commodity that we want the whole world to enjoy is freedom, as against that of slavery, ruthlessly inflicted upon millions of people by the Kremlin.

If we are to keep faith with our soldier dead, it will have to be through the approach whereby right makes might, where reason reigns, and the brotherhood of man prevails through the Fatherhood of God. This is our only choice if there is to be any world at all. We will have to learn to live together, or we die together. Our inventiveness, as well as our ability to discover the new, must be employed for the good of humanity, and not for wanton destruction. Peaceful pursuits coupled with man's reasoning power constitute an index of his maturity. Only mature people can survive. We will need to grow up if we are going to be here at all. Our survival or annihilation will depend upon how successfully we solve the problem so well stated by Burt Garnett:

> Our problem, now, is not to make thermo-nuclear bombs. Our problem is to create a moral and intellectual atmosphere that will prevent their use. The first task is scientific; the second is definitely humanistic.

Objectives of an Auto Shop Program

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When a new program is to be set up, or an old one reorganized or evaluated, there are many factors which instructors and administrators must consider. This holds true whether the subject be English, history, science, or auto mechanics. These various factors must be carefully analyzed, studied, and evaluated in order that the result will be a well-organized curriculum which will be effective in educating our students. A real learning situation needs to have a goal and the means of attaining this goal.

The first step in constructing a program is to set down definite objectives which will be the goals that are to be reached. These objectives will be significantly different for the same subjects in different schools. Because of this, it is essential that the objectives be selected by analyzing and studying the students' interests, problems, and needs; the com-

munity; and the objectives that have been determined by leaders in a given field. The objectives that are obtained by these three sources must then be screened by scrutinizing them to see whether they comply with the philosophy of the school and the principles in psychology of learning. After that the objectives should be reworded in a form so that there are two parts to each one: the behavior changes and the content aspect. When these steps are complete, the objectives will be positive guides for the specific situation and will be of great value in selecting and carrying out experiences to achieve the objectives.

Students are studied by various techniques. Some of these are by observation, interviews, questionnaires, tests, records, and surveys. The survey method was used in studying the interests, problems, and needs of 80 auto shop students. Their grade range was from 10 to 12 and their ages ranged from 15 to 18. The students were asked to list all their interests, needs, and problems in general which relate to the school, home, and social life. They were asked to hand in their papers without putting names on them. This procedure was used in order to acquire accurate information from the students without the possibility that their responses might reflect on them. These lists were tallied and put into sequential order according to the frequency various responses were listed. Forty-three interests, needs, and problem categories were obtained. They are listed in Table I.

From this list we were able to analyze the various interests, needs, and problems which would allow us to set down certain general objectives for an auto shop student. A great deal of thought is necessary in order that the objectives that are formed are a true analysis of the listings. In Table I the objectives that are listed are actually obtained by using one or more of these various interests, needs, and problems and wording them in objective form. The numbers after each objective indicate the listings that went into the formulation of each objective.

When a student lists his interests and needs it seems there are no words spared, and he writes exactly the things he feels. A true picture of his interests, needs, and problems can be gotten by using the survey method. If an adult tried to list these factors, many would be omitted, and it is doubtful whether the amount of weight placed on each one would be the same. A listing such as this seems more realistic and down to earth. Of course, it isn't the only approach to the situation, but it is a very good one.

The objectives that were just formed. however, are general in nature and could relate to many different classrooms. Now it is necessary to lay down specific objectives for a beginning group of auto shop students and an advanced group.

A group of 21 beginning auto shop students were asked to list the reasons why they took auto shop. The various reasons were tallied in the same manner as the first group and were also put into sequential order according to the number of times it was listed. By studying this data we can now write down several more objectives which these various reasons indicated. Table II shows which reasons apply to the various objectives.

It can be clearly seen that these objectives are more closely related to auto shop. This is a very small sampling, but it is believed to be a workable sampling in this type of survey.

A group of 35 advanced auto shop students were surveyed. They were asked why they took the advanced courses and how it would help them now and in the future. These statements were tallied in the same manner as the others. Table III shows the objectives and from what statements they were derived. It can be seen how these objectives closely relate to auto mechanics. They are related to definite aspects of this field and auto mechanics as a future vocation.

Now we will turn to the leaders in the field and list the objectives of specialists. These objectives may be either too exacting or possibly too general to meet the needs of a particular group. Here again we must study these objectives listed by authorities and determine how these coincide and differ from the ones we have listed. We then may alter our objectives slightly if it is deemed necessary.

We must now analyze the community in order that our objectives take into cognizance the community background from which this group is drawn. Every community is different to a certain degree, so an analysis of the community is essential. Many methods may be employed. Information about the community may be secured by observation, opinion polls, student census, records, newspapers, churches, industries, and businessmen. An analysis of the Senn High School community was obtained by using school records and the school history. Table IV lists eleven characteristics of the community, and three additional objectives were obtained from these characteristics.

We can now easily see if we are going in the right direction. However, if our objectives are different to a degree, it might mean that ours meet the particular situation more readily than the general ones of an authority. Considerable study must be given to this point to determine whether a modification in these objectives is necessary.

PITT HOLDS ENGINEERING WEEK

Two mechanical engineering students at the University of Pittsburgh discuss their model heat pump for heating and cooling. This display, constructed by the students themselves, was one of many featured during the annual Engineering Week activities at the University of Pittsburgh

For example, in "Standards for Automotive Service Instruction in Schools" which was prepared by the Automotive Industry — Vocational Educational Conference — five general areas of automotive instruction are listed. These are as follows:

1. Automotive Hand Tools
2. Automotive Chassis
3. Automotive Electrical
4. Automotive Engine
5. Automotive Service

These five areas are then broken down into basic items to be taught. This is another approach to the situation. By studying these five areas and comparing them to the objectives we have obtained we find a great deal of similarity. This indicates we are on the right track.

Now we must screen these objectives by laying down certain philosophical principles. These can be the philosophy of the particular school system, or of the teacher, or of specialists in the field. The following is the Chicago philosophy:

1. Education serves all people in a democracy.
2. Education develops democratic ideals.
3. Education changes behavior.
4. Education deals with all aspects of life.
5. Education functions through many agencies.
6. Education continues throughout life.
7. Education aims at self-direction.
8. Education provides for intelligent adjustment to social changes.

In screening the objectives that have been previously set down, we find that they are in full agreement with the Chicago philosophy. Therefore, we must now list the principles of learning and the major areas of living which constitute the basis for the Chicago psychology. The principles of learning for the Chicago School System are as follows:

1. Learning is an activity.
2. Effective learning is meaningful.
3. Motivation vitalizes learning.
4. Satisfactions accompany effective learning.
5. The social group affects the learning process.
6. Teacher-pupil relations influence learning.
7. Important learnings take time to acquire.
8. Learning produces varied responses.
9. Emotionally-charged experiences may result in rapid learning.
10. Practice makes a learning permanent.
11. Learning is transferrable.

The nine major functions of living for the Chicago School System are:

1. Practicing American citizenship.
2. Using the tools of communication.
3. Developing economic competence.
4. Improving family living.
5. Protecting life and health.
6. Building human relationships.
7. Enjoying wholesome leisure.
8. Satisfying spiritual and aesthetic needs.
9. Meeting vocational responsibilities.

The 20 objectives that we have set down are in accordance with the Chicago psychology. By screening these objectives in these various ways, and in finding no conflicting statements, we are assured that our objectives comply with the Chicago philosophy and psychology.

It now becomes necessary to re-word our objectives so that each consists of the behavior changes to take place and the content area where this will occur. This requires a great deal of study in order that the final objectives that are obtained are complete and of a directional nature in setting up the course content. R. W. Tyler, in his syllabus, "Basic Principles of Curriculum and Instruction," suggests that a two-dimensional chart be set up in stating objectives in this manner. The behavior aspects of the objectives are listed at the top of the chart, and the content aspects of the objectives are listed vertically. A chart of this type with the auto shop objectives follows:

	Appreciation	*Habits*	*Abilities and Skills*	*Information*	*Social Attitudes*	*Interests*
Vocations	X	X	X	X		X
Mechanical	X	X	X	X	X	X
Mental Health	X	X		X	X	X
Physical Cleanliness	X	X		X	X	X
Practical Work	X	X	X	X		X
Maintenance of Auto	X	X	X	X		X
Tools and Equipment	X	X	X	X		X

From this chart we are able to set up specific objectives with both behavior changes and content aspects included. These objectives are as follows:

1. To develop abilities, skills, appreciations, and interests in the automotive vocation.
2. To develop appreciations and interests in mental health for good social attitudes.
3. To acquire good habits, skills, and appreciations of tools and equipment and their use.
4. To develop good habits, skills, and abilities in the maintenance of an automobile.
5. To promote good habits, abilities, and skills through practical work.
6. To instill a sense of appreciation and good social attitudes toward physical cleanliness.
7. To foster appreciation and interest through the exercise of abilities and skills for the mechanical field.

The above seven objectives will be of great value in selecting course content, along with the use of the chart. These objectives, however, pertain to the Senn High School auto shop, and are not general auto shop objectives to be used in any school. Nevertheless, some of them may be applied to certain shops. They are objectives that have been obtained by surveying the students' interests, problems, and needs; the community; and the objectives of leaders in the automotive field. Because the students and the community are specific, these objectives relate to this particular situation. By screening these objectives through philosophy and psychology and later rewriting them the final result is an effective, content-selecting set of objectives.

This is an approach that can be used at any time when curriculum construction and revision is being considered. The result will be an efficient guide for planning a program of experiences in educating the learner.

TABLE I. Interests, Needs, and Problems of Eighty Auto Shop Students

1. Earning money at a good job	46
2. Mechanical interests	39
3. Car	36
4. Future vocation	35
5. Subject difficulty	31
6. Dating	23
7. Sports	16
8. Purchasing equipment for hobby	14
9. School sports	11
10. Join armed forces	10
11. How to study	9
12. Choosing a college	9
13. Parental difficulties	8
14. Better job	7
15. Raising grades	7
16. Boy friends	6
17. Travel	6
18. Body building	6
19. Club	6
20. Get along with other people	6
21. Finishing high school	5
22. Hunting	5
23. Laziness	4
24. Would like to move	4
25. Cleanliness	4
26. Marriage	3
27. Fishing	3
28. Obtaining a job while in college	3
29. Uneasiness with girls	3
30. Time for homework	3
31. Clothes	3
32. Engineering	2
33. Games at home for recreation	2
34. Visiting friends	2
35. Stay out of trouble	2
36. More clothes	2
37. How to handle money	2
38. Work up to capacity	2
39. Understand people	2
40. Buy a home	2
41. Church	1
42. Control temper	1
43. Place to spend vacations	1
44. Rearing of children	1

Objectives

1. To develop interests in job and vocational information. 1, 2, 3, 4, 10, 12, 14, 20, 21, 28, 32, 39
2. To develop skills and abilities in the mechanical fields. 2, 3, 4, 5, 8, 20, 25, 28, 38, 39
3. To develop skill and understanding in solving problems. 1, 2, 3, 4, 10, 12, 14, 20, 21, 28, 29, 30, 35, 37, 38, 39, 42
4. To develop an interest in leisure time activities. 1, 2, 6, 7, 8, 9, 11, 16, 17, 18, 19, 22, 27
5. To develop an understanding of mental health and physical cleanliness. 6, 7, 9, 11, 13, 15, 16, 18, 19, 20, 25, 26, 29, 35, 38, 39, 41, 42
6. To develop a feeling of independence and broad interests. 1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 43, 44

TABLE II. Reasons Why Beginning Auto Shop Students Took Auto Shop

1.	Desire to learn about cars	21
2.	Training for future job	11
3.	Gain experience	7
4.	Liked cars	6
5.	Desire to work on cars	5
6.	Heard about shop	4
7.	Learn body work	3
8.	Friends with others in shop	3
9.	Credit	3
10.	Learn about engines	2
11.	To work by themselves	2
12.	No homework	2

Objectives

1. To develop an understanding of the automobile. 1, 2, 3, 4, 5, 6, 7, 10
2. To develop skills by doing practical work on the automobile. 1, 2, 3, 4, 5, 6, 7, 10, 11, 12
3. To develop good attitudes and habits while working with other members of the class. 2, 5, 6, 7, 8, 11
4. To develop an appreciation of the many skills that are needed to become an auto mechanic. 1, 2, 3, 5, 6, 7, 10, 11
5. To develop a knowledge and an understanding of the automobile industry as a future vocation. 1, 2, 3, 4, 5, 6, 7, 10

TABLE III. What Advanced Auto Shop Students Plan to Gain

1.	Maintenance of own cars	18
2.	Better knowledge of auto mechanics	17
3.	Career	13
4.	Learn how to use equipment	12
5.	Cars are hobby	10
6.	Like shop	8
7.	Solve mechanical problems	6
8.	Part time job	5
9.	Learn safety practices	4
10.	Purchase of a car	3

Objectives

1. To develop skills in the maintenance of an automobile. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
2. To develop a thorough knowledge and interest in the automotive industry. 1, 2, 3, 4, 5, 7, 8, 9, 10
3. To develop an interest, appreciation and knowledge of the various tools and equipment. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
4. To develop trouble shooting techniques in repairing automobiles. 1, 2, 3, 4, 5, 7, 8, 9, 10
5. To develop a knowledge of solving problems pertaining to the automotive field. 1, 2, 3, 4, 5, 7, 9, 10
6. To develop skills in order that a future in the automotive field may be had. 1, 2, 3, 4, 5, 7, 8, 9, 10

TABLE IV. Characteristics of the Community

1. 3400 attend the high school.
2. Members of the Jewish religion are in majority.
3. Outstanding for its scholarship.
4. 70 to 75 per cent of the students go to college.
5. Primarily residential with considerable business zoning.
6. Few industrial plants in immediate area.
7. Above average income bracket.
8. High proportion of professional and business people.
9. Largest P.T.A. in state.
10. Small percentage of dropouts.
11. Good transportation.
12. Average stability.

Objectives

1. To develop interests, appreciations, and attitudes of worthy leisure time activities. 1, 2, 3, 4, 5, 7, 8, 9, 10, 12
2. To develop attitudes, appreciation, and interest in a future vocation. 1, 2, 3, 4, 5, 6, 7, 8, 10, 12
3. To develop interests, appreciations, and skills in the business and industrial field. 1, 2, 3, 4, 5, 6, 7, 8, 11, 12

Designing Is Problem Solving

DR. HERBERT A. ANDERSON
Formerly Head of Woodworking Department
Stout State College
Menomonie, Wis.
At present with Stanford Contract Team
Iloilo School of Arts and Trades
Iloilo City, Philippines

Mike is about to turn a wood fishing lure on the lathe. There isn't any doubt about his need for the lure because it will replace his favorite which he lost on a big bass last summer. He took the dimensions on his drawing from a similar lure which his Dad owns. However, Mike's progress halts abruptly when he was confronted with the problem of selecting an appropriate wood. Dad said, "Nothing doing!" when Mike suggested using a jackknife to cut a sample wood sliver from Dad's lure. Coming to Mike's aid, his shop teacher raised a few questions: Should the lure float high and therefore be light? What about the weight for casting? Must the wood resist decay? These and other questions caused Mike to do some research. He finally decided upon cedar as the wood which seemed to fit most of his requirements.

1. A casting lure is a design problem

Did Mike design the lure? The answer is obviously, "No." But he did solve one design problem — that of selecting the wood. In the same manner, the complete process of designing any article is concerned with solving a series of problems.

Consider the case of John, another youngster in the ninth grade. Small for

2. A good hit — proof of a good bat design

his age, John nevertheless made the first string on his neighborhood baseball team. The bats were too long and too heavy, so he decided to make his own. Now John was well aware of the shape of a bat. He had to determine, however, the most comfortable weight, length, and size for his grip. Upon investigating, he learned that the wood must be of straight grain, that the trademark is in a certain position, and that some woods are more appropriate than others.

John's design problem was not one of originating a new and different article which would fit his specific needs. It seems certain that John experimented to answer his questions of weight and dimensions. Before selecting a wood, he no doubt consulted some source to learn the characteristics of various woods.

It is the responsibility of the industrial-arts teacher to encourage and guide such students as Mike and John in their search for the answers to these and other design problems. So often industrial-arts teachers are bewildered about how to teach the skill of designing. This apprehension may be attributed to a preconceived belief that designing an article means only to make it aesthetic. Pleasing appearance is important, it is true, but because of the very nature of an industrial-arts teacher's background and training, he will do well to begin teaching design by solving problems which will assure a useful article. Later in the design process, he can stress appearance.

Perhaps if the act of designing were to be outlined by stages of work through which one would pass, the industrial-arts teacher could give organized thought to the method of teaching design.

Design Process

The *first stage* of work seems to be that of establishing a *need* for an article. If the project selected is based on a real need, the student will be motivated sufficiently to complete the remaining stages of the design process.

Another stage of work in the process of designing an article is that of listing questions which, when answered, will help the designer visualize size, specific purpose, location, materials, and, to some extent, the appearance of the article. This stage of work is termed *project analysis.*

The *third stage* is *research;* here one seeks answers to the questions which developed during the project analysis. Some of these questions may be answered immediately by the designer or his consultants; others probably require investigation. That investigation, in turn, may demand *experimentation,*[1] *interview, documentary study and correspondence.*

The analysis and research stages contribute organized thought to the process of designing. It is especially important, therefore, that beginners *record* all information which comes to light.

The designer is now ready to *sketch.* He draws his pictorial sketches free hand with a 4B pencil on soft textured paper, sketching in terms of the information which came about through research. As he sketches, it is possible for him to create mock-ups of certain sections of an article to ascertain feasibility of construction or to make that article functional to a maximum degree. It is in this stage that the designer will also give thought to aesthetic values. Such principles of design as *division of mass, proportions, balance, unity, contour enrichment, surface enrichment,* and similar factors should be studied and considered in an effort to make the article *pleasing to view.*

The last stage in the process of designing an article is to make a working model and then complete the working drawing.

Perhaps the following three fictitious situations may help to illustrate the first four stages of the design process:

Stan's Record Cabinet

Stan is a junior at Lincoln High School. After many hours of serving teen-agers from behind the soda fountain at the corner drugstore, Stan finally acquired the purchase price of a HI-FI record player. As his collection of records grew, Stan realized that he *needed* some type of record holder, and when his shop teacher suggested that the next project be designed by the student, Stan said to himself, "This is my chance to plan and build that record cabinet I've been wanting."

As he pondered the problem, Stan was confronted by such questions as these: (Analysis)

1. Will albums and single records be stored? *Answer:* Yes, 45 RPM and 78 RPM albums and single.

2. For how many records must storage be provided? *Answer:* Approximately, 30 albums and 200 single records; provides for 5 year collection growth.

3. Where will the record holder be placed? *Answer:* Record holder will be secured to the wall at shoulder level.

4. How much floor or wall space is available? *Answer:* Seven feet of horizontal wall space is available. The record player will be located below or in the area of the record cabinet.

5. Records of what diameter will be stored? *Answer:* The 45 RPM is a 7 inch record, whereas the 78 RPM is a 10 inch record.

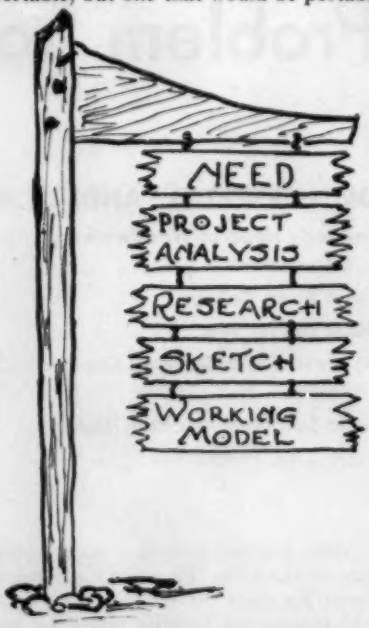
[1]Read Dreyfuss, Henry, *Designing for People* (New York: Simon and Schuster, 1955).

3. The teacher's job — to guide in good design

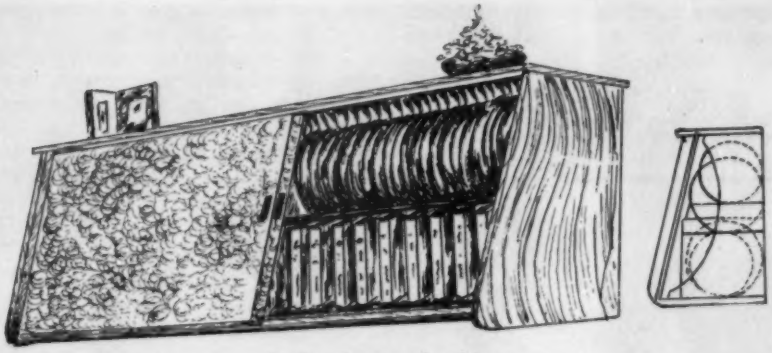
Jerry's Boat Seat

During a camping trip to a lake in the north woods, Jerry, a home workshop enthusiast, was privileged to use a boat seat which was fastened permanently to the conventional board seat. It featured a back support and could be swiveled for any casting position.

Upon returning to his workshop, Jerry wondered why he could not design a seat which was equally comfortable, but one that would be portable



4. The five steps of project design

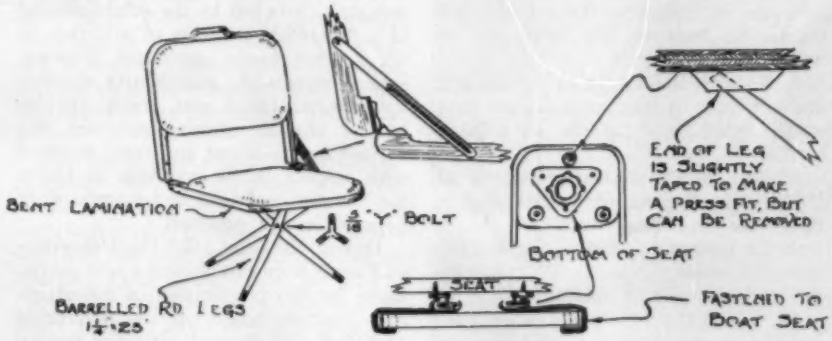


5. Stan's record cabinet

and could possibly be converted into a camp stool. Jerry recalled a statement made by his woodworking teacher that when a person is to plan a project, he must first make an analysis of his problem, that is, he must seek answers to certain questions about his project.

The following questions, therefore, appeared on Jerry's list:

1. If the seat is to be portable, how must it collapse or fold? *Answer:* The back should fold to the seat so that it can be carried and stored easily. The legs too should collapse so that they can be easily stored when used for a boat seat.


SEAT LAMINATION
"Y" BOLT
BARRELLED RD LEGS
END OF LEG IS SLIGHTLY TAPED TO MAKE A PRESS FIT, BUT CAN BE REMOVED
BOTTOM OF SEAT
SEAT
FASTENED TO BOAT SEAT

6. Jerry's boat seat

2. What fixtures are available for folding? *Answer:* Hinges and support brackets could be used to join the back and seat. Irons as are used on commercial camp stools could be made. A "Y" bolt chair fixture would be used to revolve seat.

3. Shall the seat include a cushion? *Answer:* Yes, of some weather resistant material. However, life preserving cushions could also be used.

4. Can the seat be easily converted from a boat seat to a camp stool? *Answer:* After some experimentation, conversion from a boat seat to a camp stool should be feasible.

5. What materials will provide adequate strength and yet be light enough to carry? *Answer:* Numerous woods such as ash, hickory, and white oak were considered. Strength and lightness can be achieved by bent wood lamination.

6. Can the boat seat be readily stored? *Answer:* Yes, if it can be made to collapse.

Sam's Gun Holder

Sam was fondling the new 22 automatic rifle which "Santa" had left him. It was a beauty, equipped with a 2½ power scope. As Sam placed the gun in a corner of the closet with his shotgun, an idea flashed through his mind, "Why not build a holder in which I could store my two guns and provide space for another, such as a high-powered rifle?" Then the idea of storing ammunition in the same cabinet appealed to him.

Immediately, Sam began to search for ideas. First, he visited sporting goods stores. Then friends offered their opinions and invited him to see their gun cabinets but nothing seemed to satisfy his particular needs.

One evening Dad brought a business associate, an industrial engineer, home for dinner. After a time Sam decided to ask Dad's friend for ideas about building the gun holder. The industrial designer suggested that they begin by raising questions about the proposed holder. Then they could seek some answers. The questions they raised were these:

1. How many guns are to be stored? *Answer:* Four.

2. What calibers, types, and sizes are these guns? *Answer:* 12 gauge pump shotgun, over-all length 46″; .300 high-powered rifle, over-all length 42″; .22 Cal. rifle with scope, over-all length 43″; .22 Cal. pistol.

3. Are they to be stored in an enclosed or open holder? *Answer:* Enclosed.

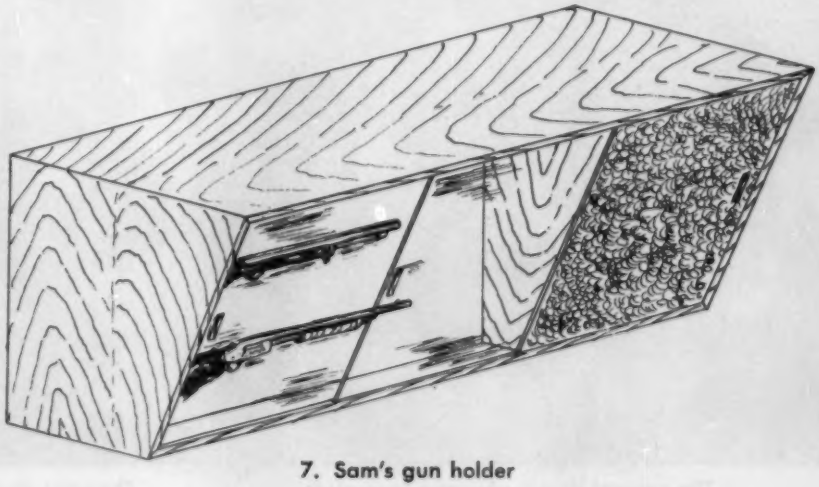
4. Is the cabinet to be placed on a wall or on the floor? *Answer:* Wall, at eye level.

5. Will ammunition, cleaning rods or other accessories be stored in the case? *Answer:* Yes.

6. Is the case to be locked? *Answer:* Yes.

Summary

Problem solving takes place on all progress levels. Problems pertaining to project planning are design problems and industrial-arts teachers should encourage and guide students in the process of solving design problems. In fact, designing may be taught on all progress levels. Beginners will solve one or two simple design problems, whereas ad-



7. Sam's gun holder

vanced students may solve all problems which occur in designing an original project.

Because designing is a continuous process of solving problems, it follows that designing should be taught on a continuous basis as problems present themselves, not as a single, isolated unit of instruction.

Sketches by Stout State students — Larry Ellefson, Dick Cabak, and Willard Bengs.

Industrial Arts in Puerto Rico

FERDINAND F. ROSSI
General Supervisor, Industrial Arts
Hato Rey, Puerto Rico

Development Before 1951

The industrial-arts program in Puerto Rico has gone through three stages: manual training, 1908–17, manual arts, 1917–39; and industrial arts from 1939 up to the present time.

During the school year 1949–50 a reorganization was initiated based on the following objectives:

1. To contribute to general education, as an integral part of the education of the individual who is living in an industrial era.
2. To develop desirable social habits in the individual.
3. To explore the interests, capacities, and abilities of the student by means of opportunities that allow him to show creative expression in industrial arts.
4. To offer orientation in the selection of a trade or occupation.
5. To promote in the student acceptable hobby interests related to activities carried out in industrial arts, in order to guide him to make good use of his leisure.
6. To lead the student to obtain experience in industrial arts that contribute to improve the conditions in both school and home.
7. To offer knowledge to the student and cultivate in him appreciations that would make him capable as a good consumer.
8. To offer the student prevocational facilities as a basis for his choices in his future vocational education.
9. To guide the pupil in the acquisition of knowledge related with the products and processes of industry.
10. To prepare the pupil who is interested in any of the fields of industrial arts as a means to earn a living, provided he has ability for it.

A new organization based on laboratories of industries and general shops was established in some junior high schools on an experimental basis. The program was placed under the direction of the division of vocational education.

During the year 1950 a staff of assistant supervisors and teacher educators was appointed to work with the state supervisor in the improvement of the program.

Present Development

A great impetus toward the improvement of industrial-arts education in Puerto Rico took place during the year 1951. At that time the industrial-arts supervisory staff and teachers had the help and orientation of Dr. Robert L. Thompson, professor of industrial education of New York University. Dr. Thompson came to Puerto Rico that year to teach a course related to the problems affecting industrial-arts educators. The work done under his leadership served as a directive toward the improvement of industrial arts teaching. He also served as counselor to supervisors and teachers who later went to the United States to continue graduate studies in industrial arts.

The general educational approach for industrial arts led to the establishment of a diversified program of activities in six general areas: technical drawing, general woodwork, graphic arts, electricity, general metal and crafts. An intensive teacher training program was carried out to orient and train teachers with respect to the methods of teaching the new technical and manual work covered in the program.

During the year 1953 the University of Puerto Rico established a new curriculum for the preparation of industrial-arts teachers based on the diversified technical and manual activities needed

The general shop is always a busy place

The print shop is a place of compelling interest

Book binding is taught

Safety is an integral part of all shop practice

for teaching these subjects in the public schools.

In our present organization, industrial arts is a subject of the general education program in our junior high school and an elective course in senior high school. It offers those learning experiences which assist boys and girls to understand the industrial and technological aspects of life today. The students learn about industry in general: organization, raw material, processes and operations, products, occupations, and the problem resulting from the industrial and technological nature of society.

The junior high school industrial-arts program offers a rich exploratory experience to all eighth and ninth grade boys in a variety of basic industrial-arts activities included in the six areas of studies. After completing a general course in the first year, pupils may select one or more of these areas in which they have shown interest and ability for further study.

The junior high school industrial-arts courses are conducted in general shops, each representing a broad industrial field. Projects are based on student's appeal and needs. In addition to expioring broad occupational fields through typical manipulative experience, pupils gain occupational and industrial information through studies and investigations, illustrated talks, demonstrations, motion pictures, visits to industrial plants, and other effective teaching techniques.

Approximately 363 full-time industrial-arts teachers are employed in junior high schools. The classes meet 80 minutes a day, Monday through Friday.

Industrial arts on the senior high school level emerges as a continuation of the exploratory phase of junior high school shopwork. Students choosing the industrial-arts curriculum may concentrate in one or more industrial areas.

Senior high schools offer experience in a variety of industrial-arts activities, depending somewhat upon the special needs of the students and the kind of community in which individual schools are located. Most schools offer mechanical and architectural drafting, electricity and radio, general metal and woodwork.

Above – The Puerto Rico Chapter of EPT is active
Below – A typical exhibit of school shop products

Senior industrial-arts teachers also participate in the co-ordination of a work experience program between the school and the occupat'onal centers of the community.

Approximately 33 full-time industrial-arts teachers are employed in senior high schools. Classes meet one hundred minutes each day, five days per week.

GIVE THE STUDENTS A GOOD START

ROBERT H. WILLIAMS
Eagle Valley Union High School
Richland, Ore.

The first day in the industrial-arts laboratory is a new and unique experience for the beginning student. He enters a world as unfamiliar to him as that of outer space. He will be amazed, confused, bewildered, and probably frightened by the amount of and the looks of the tools and machines. He will realize at once that he knows little about these tools and machines and that he must learn much to become proficient in their use. Usually he will be willing to try if the proper atmosphere is apparent in the shop.

The problem of providing this atmosphere is a big one for the shop teacher. He must recognize it and find the solution for it. He must overcome the student's feeling of bewilderment and see that each student gets off to a flying start. Just as in a race the beginning is important, so in the shop the beginning for a student is important.

How can the teacher get the student off to a good start? He must be enthusiastic about his work. To him this class must be the most important in the school, and he must look upon his students as the most important in the school. He must, and can, give the students the feeling of being wanted and appreciated.

The student needs security; give him a list of rules to follow in the shop so he will be able to know his actions are approved by the teacher. Teachers have generally seen lists of this kind. They can make their own, or they can take suitable ideas from published lists. The written list is the beginning of making your students feel secure, and it will pay dividends. This step will be followed up by a more satisfying form of security when the student begins his work. This will be the security felt when one is successful in his work. Instructors should choose their beginning project, or group of projects very carefully. Be sure that the possibility for success on these projects is near 100 per cent. Be willing to help the student if he gets a poor piece of material, or makes a mistake, or if he gets behind. Help him before he bogs down.

If necessary, cut the board for him, sharpen his plane iron, demonstrate skills on his project to help him along, and last, be available when he needs the help, don't ask him to wait, because he is already behind. This help may deprive the student of a small operation, but it does prevent boredom. Boredom will kill the student's interest. The operation he misses can be learned later.

The beginning is important — without it there will be no successful end.

MR. HENRY FORD II RECEIVES A.V.A. CITATION

Henry Ford II, president of Ford Motor Company, has been awarded the distinguished service citation of the American Vocational Association "for meritorious service which has contributed to the benefit of mankind."

Mr. Ford is the sixth person and the first businessman to receive the citation in the 59-year history of the AVA, a national professional organization for teachers and administrators in vocational education.

Other recipients were Sen. Walter F. George of Georgia, Sen. Lister Hill of Alabama, Rep. Graham Borden of North Carolina, Rep. John Fogarty of Rhode Island, and Rep. Daniel A. Reed of New York.

The citation also commended Mr. Ford:

". . . For the maintenance of company policies and practices which have resulted in a high standard of living for workers;

". . . For understanding the relationship of education to industry;

". . . For sponsorship of the Ford Industrial-Arts Awards program which has helped millions of American youth adapt their knowledge of craftsmanship and ideals to industrial processes;

". . . For support of vocational and practical arts education which has contributed to the productivity and high living standards of all American people;

". . . For co-operation in the work of the automotive industry American Vocational Association committee which has elevated automotive servicing standards throughout the nation."

Each year since 1950, the company through the Industrial-Arts Award program has offered cash awards for the top classroom projects submitted by school age craftsmen throughout the nation. This year some 40,000 students are competing for $50,000 in awards.

The AVA citation, in the form of an embossed scroll, was given to Mr. Ford in a ceremony at Dearborn, Mich., on June 3. It was presented by Frank C. Moore, director of industrial arts for the Cleveland

Mr. Henry Ford II (left), president of Ford Motor Company, and Frank C. Moore of Cleveland, a past president of the AVA, who presented the award in Dearborn, Mich.

Public Schools, and former president of the association.

Dr. M. D. Mobley of Washington, D. C., executive secretary of the AVA, attended.

GREETING THE NEW SEVENTH GRADE PUPIL

MERVYN T. JONES
Norristown School District
Norristown, Pa.

Did it ever occur to you, as an industrial-arts teacher, that many of the boys that come to your shop as seventh graders have never used a tool as simple as a pair of pliers? I know it doesn't seem possible that a child between the ages of eleven and thirteen hasn't used such a simple tool, but think about it for a few moments. When has it been necessary for him to use any of the simple hand tools?

In these modern times, most children receive their toys as new toys rather than as hand-me-downs such as we might have received. Most of the smaller toys they have used were made of plastics which had to be replaced more often than repaired. The quality of tricycles and bicycles that they have had are such that they have needed little repair, and in most cases when they did need repairs, they were made by a professional repairman.

Not only have these children not used these tools themselves, but in many cases they have never seen them used. Many of them have lived in apartments where all repairs were made by the landlord or the apartment manager. They seldom get to a repair shop to watch a mechanic work on the family car, and very few of their Dads work on their own cars today. In short, they have more or less depended on someone else to fix anything that "didn't work."

Now suddenly they are in a new school with new teachers, new classmates, new subjects, and even a different teacher for each subject. Most of the class subjects are familar to them but then they see the words *industrial arts* on the schedule card. Even though this *new* subject was explained to them last June, the majority of them have forgotten just what it is.

Then these youngsters enter the shop and are confronted with many new machines, hand tools, fasteners, and materials. Some of these young people are actually frightened by these many strange tools and machines. I feel that at this particular point it is our duty as teachers to erase this fear from their minds as quickly and as gently as possible. Put them at ease, explain the program, tell them that every phase of the work will be explained to all of them.

It is not my intention to tell you what to say to these new students, but it is my intention to remind you that this is a crucial point in the impressive mind of the youngster, and it is up to us to handle this point with the utmost care so that these pupils will enjoy this new experience in industrial arts.

THE FORD INDUSTRIAL ARTS AWARDS

The splendid examples of workmanship submitted by students from grades 7 to 12 inclusive, which were sent to Greenfield Village, Dearborn, Mich., for judging July 10, 11, and 12, presented an excellent picture of the effect which Industrial Arts Awards, sponsored by the Ford Motor Company, has had in the upgrading of architectural drafting, ceramics, electricity, graphic drafting, model making, miscellaneous projects, patternmaking and molding, plastics, woodworking, and wrought metal, in the schools.

The articles to be judged were displayed at the Edsel Ford High School, Dearborn, Mich. There were upward of 4200 pieces submitted, this being the cream of the 400,000 or more that had gone through the winnowing process of about 400,000 pieces that had been displayed at the student craftsmen's fairs at the local and regional competitions of the industrial-arts awards international award-winning entries which were held in the United States, Alaska, Hawaii, Puerto Rico, and Ontario, Canada.

The judges for 1957 were:

Architectural Drafting Division

L. L. Gore (chairman), Industrial Arts Department, George Peabody College for Teachers, Nashville, Tenn.

Stewart Kissinger, Detroit, Mich.

Joseph Morbito, Architectural Department, Kent State University, Kent, Ohio.

Ceramics and Models Division

H. J. Brennan (chairman), Industrial Education, Rochester Institute of Technology, Rochester, N. Y.

Estell H. Curry, Division of Instruction, Detroit Board of Education, Detroit, Mich.

John M. Hurley, Bureau of Vocational Activities, Board of Education, Brooklyn, N. Y.

Electrical Division

L. M. Augustus (chairman), Michigan Bell Telephone Company, Detroit, Mich.

Peter Buban, Quincy, Ill.

J. Herbert Detrick, Industrial Arts Department, Public Schools, Parma, Ohio

Graphic Arts Division

Larry Prakken (chairman), *School Shop Magazine*, Ann Arbor, Mich.

Elmer R. Lundgren, William Hood Dunwoody Industrial Institute, Minneapolis, Minn.

Edward J. Medeiros, Trade and Industrial Education, Providence, R. I.

Jewelry and Wrought Metal Division

Alexander Bick (chairman), Milwaukee, Wis.

Albert Feirer, Trade and Industrial Education, Division of Vocational Education, Honolulu, Hawaii

Earl L. Bedell, Board of Education, Detroit, Mich.

Machine Shop Division

William Hawley (chairman), Department of Vocational Education, Michigan State University, East Lansing, Mich.

Joseph D. Dolan, United States Department of Labor, Bureau of Apprenticeship and Training, Philadelphia, Pa.

L. W. Yoho, Industrial and Adult Education, South Bend, Ind.

Mechanical Drawing Division

Harry Meinert (chairman), Illinois Industrial Education Clubs, Springfield, Ill.

Dr. Verne C. Fryklund, Stout State College, Menomonie, Wis.

Earl Phillips, Mumford High School, Detroit, Mich.

Open Division

Dr. Harold Silvius (chairman), Wayne State University, Detroit, Mich.

Frank W. Dalton, Vocational Education and Practical Arts, University of Michigan, Ann Arbor, Mich.

Merle Leggett, Industrial Arts Education, Medina County Schools, Medina, Ohio

Patternmaking and Molding Division

Thomas Diamond (chairman), *School Shop Magazine*, Ann Arbor, Mich.

Fred W. Ziegenhagen, Boys Technical High School, Milwaukee, Wis.

Plastics and Leather Division

Leonard Glismann (chairman), Industrial Arts Education, Department of Public Instruction, Salt Lake City, Utah

Marshall Hurst, Industrial Arts, The Board of Public Instruction, Miami, Fla.

George W. Mulling, Trade and Industrial Education, State Department of Education, Atlanta, Ga.

Woodworking Division

John J. Smith (chairman), Industrial Arts Education, Trenton, N. J.

Dr. M. Ray Karnes, Industrial Education, University of Illinois, Urbana, Ill.

John Metz, *Industrial Arts and Vocational Education Magazine*, Milwaukee, Wis.

The Ford Motor Company offers more than 1500 individual awards each year. These awards amount to $50,000.

Among them are 72 firsts at $100 each; 72 seconds at $80 each; 72 thirds at $60; 72 fourths at $40; 432 honorable mentions at $20 each; 12 creative design prizes at $50 each; and 6 awards for ingenuity at $50 each.

Besides the foregoing, the Ford Motor Company gives 62 expense-paid three-day trips to Detroit to outstanding students and their teachers. Fifteen hundred gold pins are awarded; and all participants in the Industrial Arts Awards receive a certificate.

Great credit for the organization and excellent management of the annual industrial arts awards program is due first of all to the Ford Motor Company, and second to George Walker, vice-president and director of styling, and to Dewey Barich, Ford Administrative Headquarters, who with their interest and enthusiasm set an example that kept the judges at their not insignificant tasks.

REPRODUCTION OF SHOP DRAWINGS — PART IV

LAWRENCE S. WRIGHT
Assistant Professor of Industrial Arts
Iowa State Teachers College
Cedar Falls, Iowa

Kinds of Available Materials

Probably a wider variety of papers, cloths, and films is available for use in connection with the dry diazo process than can be obtained for use with any of the other of the four basic processes discussed in this series. These materials are available in various weights of paper from lightweight to a card weight stock. Sizes range from cut sheets in standard sizes, with special sizes cut to order, to 54 in. wide rolls of varying lengths. Opaque papers come sensitized to produce lines in black, blue, and maroon. Papers may be procured in such colors as white, pink, green, yellow, or blue. One may select from a range of relative printing speeds to get the paper best suited to one's uses. Generally print papers are sensitized on one side but double coated papers are available. A wide range of sensitized films, transparent plastic paper, and cloths are also available for use as intermediates and for other special uses. One manufacturer distributes sensitized plates for subsequent use on a standard multilith machine. Several kinds of erasing fluids are available for eradicating unwanted diazo lines.

The range of available materials for use in the moist diazo process is second only to that of the materials used in the dry diazo process. It is within the area of materials available for use that the dry diazo process has more to offer than the moist diazo process. Moist diazo process papers are available in various weights, various cut sheets of standard size with special sizes cut to order, various rollstock widths and lengths, and various relative printing speeds. Opaque papers come in white, yellow, pink, blue, and green colors. Developers are available for black, red, blue, and brown printlines. Double coated papers may be obtained. A range of transparent and translucent papers, cloths, and films are available for use as intermediates and for other special uses. One manufacturer puts out a special reflex film for copying from opaque originals — even though they may be printed on both sides.

Blueprint materials are available in opaque papers and cloths of various weights. Standard size cut sheets with special sizes cut to order and various widths and lengths of roll stock are available. A choice may be had from the relative printing speeds. Special writing fluids are available for corrections and changes to be made on the blueprints.

Vandyke materials come in the same variations as blue print papers but in addition they come in a special thin, translucent stock.

December, 1903

Orville Wright, lying on his stomach between the wings of his biplane, opens the throttle of a 12-horsepower engine and achieves the first heavier-than-air machine flight. Distance traveled — 120 feet. Time — 12 seconds.

May, 1957

A United States Air Force jet pilot rockets from California to New Jersey to set a new speed record. Distance traveled — 2405 miles. Time — 3 hours, 38 minutes.

In little more than 50 years, 54 to be exact, the science of aeronautics has progressed to the point where an average speed of 662 miles per hour — *100 times the speed of that first flight on the sand dunes at Kitty Hawk, North Carolina* — rates no more than passing news coverage in the press. And air travel is just one important chapter in the history of the transportation industry's enormous expansion during the first half of the twentieth century. — *Bakelite Review.*

Leather parade vest made by Jim Jackson, freshman in the industrial arts department (leathercrafts), at the Cottonwood, Arizona, High School. His instructor and photographer is Stan Schirmacher. — This project received a place winner in the 1956 Industrial Arts Awards

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

REMINDERS FOR THE FIRST DAY

HAVE you put your shop in first-class order so that the new students feel glad to belong to your class?

Have you arranged your shop tools in a manner that is pleasing and that can be easily maintained?

Have the material racks, especially those for storing lumber, been carefully arranged so that even the inexperienced students can see the planning that has gone into the arrangement? There must be nothing haphazard about them.

Have your shop benches been cleaned, and have they been numbered clearly?

Have you sharpened your edged tools and the saws?

Have the project storage lockers been cleaned, and properly labeled and numbered and equipped with locks and keys?

Did you prepare a project outline, and a progress chart?

Have you checked the tools, equipment, and supplies that you listed as *on hand* when school closed?

Have you checked the tools, equipment, and supplies that have been delivered on your orders over the summer months?

Have you prepared an agenda to be used as you meet your classes for the first week or two?

Have you worked out a system for collecting fees for materials used?

Have you designed a few new projects to be tried out by your students?

Have you a display board that shows your students the different parts of such a new project? Can the student follow the method you used in assembling the parts?

Have you a good set of safety posters?

Have you cleaned off last year's bulletin board?

Have you selected new clippings and mounted them on the board?

Look around the shop once more. Can you do something else to make it more attractive?

All of the previous questions will need to be answered at one time or other. It will be a great help if you can do it now when you are free to concentrate on them.

And finally, may I remind you again? Have you sent in your new address to our circulation department?

TO MAKE THE SCHOOL YEAR 1957–58 SUCCESSFUL

AND now we are starting a new school year. Possibly we teachers have forgotten to think of what we owe to the school in which we teach, or to the students we have in our classes, and to the members of our community who pay for our services. It may not be pleasant to think about this subject but it is very necessary that we have a clear picture of what our duties are and how and why we are to carry them out.

Probably to help out our thinking, it may be well to spend a brief period of time on what Dr. Heber A. Sotzin submitted to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION in his "Creed for the Industrial Arts Teacher," page 253 of the June, 1948, issue. In it he expresses his opinion of what he, as an industrial-arts teacher, felt was his duty. In it he touches upon the duty of the teacher to keep himself mentally, physically, spiritually, and emotionally fit so that his work with his students and others will be amicable, peaceful, and friendly. The teacher must try hard to understand the problems of the young and do his best to help them solve them. He must keep his shop attractive, and his tools and equipment, materials and supplies in good order so that the work of the class can be carried on efficiently. He will keep himself and his teaching material fresh and up-to-date. He must help his students to develop initiative and will guide them in the selection, design, and creation of their projects and assist them to advance according to their abilities.

He will also help them to inculcate a good understanding of the rights, duties, and dignity of labor, and to acquire appreciation and respect for the products of American labor.

Personally he will do all he can to progress professionally and to interest his students in looking forward to fitting themselves for a good vocation. He will try also to interest boys who have good qualifications to prepare themselves as teachers of industrial arts and vocational education.

PLANNING THE SHOP WORK

IT MAY be well to think about methods of having teacher and students work together on the planning of the work done in the school shop for the coming year.

Estell H. Curry, Division of Instruction, Detroit Board of Education, Detroit, Mich., describes such a teacher-student co-operative venture on pages 342–343 in the October, 1946, issue of this magazine. It may be advantageous to look over this article which treats the subject very well.

For the benefit of those who may not have that number of the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine containing the article referred to within reach, the writer takes the privilege to abstract the directions given in Mr. Curry's article.

The teacher selects a project that embodies the desired operations. He describes what it is used for and asks the boys to give it a name. After a number of names have been proposed, the class votes which name is to be used.

The instructor then asks "What is the first step to be performed in making this project." After this has been established, the students should enter the suggested and subsequent steps of procedure into their notebooks. As each step is adopted the teacher writes it on the chalkboard so that the boys have no trouble entering them correctly into their notebooks. Then the teacher demonstrates the various operations and then the same procedure is taken up with the succeeding steps.

While demonstrating, the instructor should get suggestions from the boys on what tools and materials are to be used. He asks some of the students to demonstrate the use of a tool that has been suggested. Steps that seem to be more important than others are to be called to the attention of the students. These should be circled so that this particular step can be okayed by the student foreman when the project is being made.

To plan and demonstrate the entire job may take several days. Only what can be planned or taught in a single day should be taken up at one time.

The following suggestions should be kept in mind by the teacher when helping pupils plan their work. The teacher should not allow a few boys to do all the talking. Everybody in the class should participate.

The teacher should not suggest a single step. That is the students' duty.

The teacher should write the steps on the chalkboard as they are suggested by the students.

Problems and Projects

DUCK DECOYS

BEN HUNT

Hales Corners, Wis.

No matter what season of the year you talk to Merl or Ken Rynders, you will eventually hear something about their duck hunting, their duck boats, or their decoy ducks. Or perhaps it will be dogs or guns. But it has to do with duck hunting. And when Merl came over with a hen and a drake mallard decoy, I decided to investigate. They were making two dozen cork decoys, which would bring their total to around a hundred. I dashed home and grabbed a camera and here is the result. I saved myself a lot of work making something I had no use for and — those fellows knew just what was needed, and how to go about it.

There are many things to be considered regarding decoys. General appearance, weight, durability, and last but not least, not too difficult to make.

These decoys are made of cork and wood. New cork in 2 and 2½-in. slabs can be bought but these were made of cork salvaged from wrecked freezers and refrigerators, purchased from a junk yard. When buying it, pick out lightweight pieces, as they will naturally be more bouyant than the heavier stuff.

White or sugar pine is also required, and should be kiln dried or otherwise well seasoned. For the baseboards you can use ¾ or ⅞-in. lumber and for the heads full 2-in. stuff. Get some ⅜-in. material for the tail boards.

For a dozen decoys you will also need a half gallon of powdered weldwood resin

Fig. 2A. Making the sawing jig

Fig. 3. Cutting out the baseboard

Fig. 4. Gluing the slab cork onto the baseboard

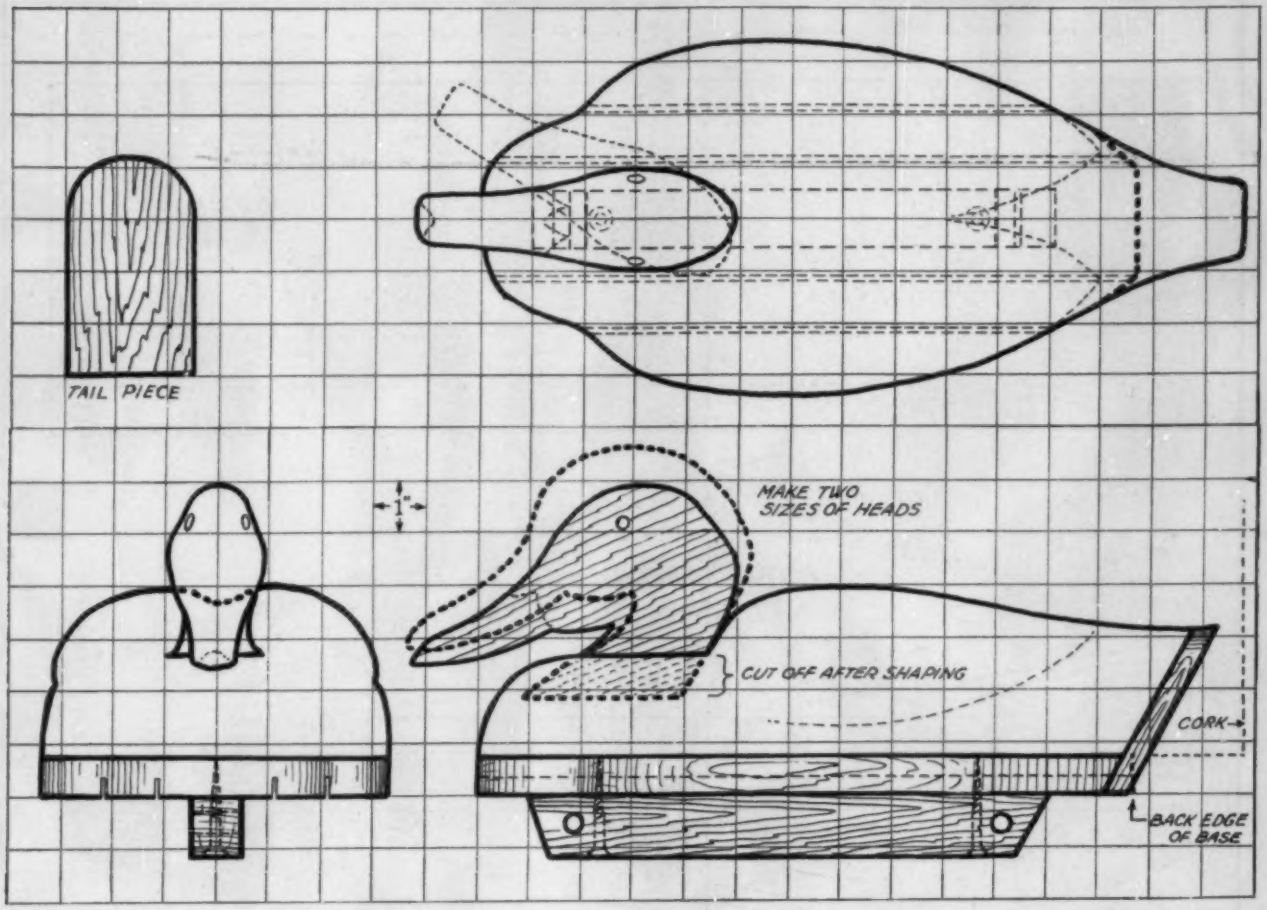


Fig. 1. Details of the duck decoy

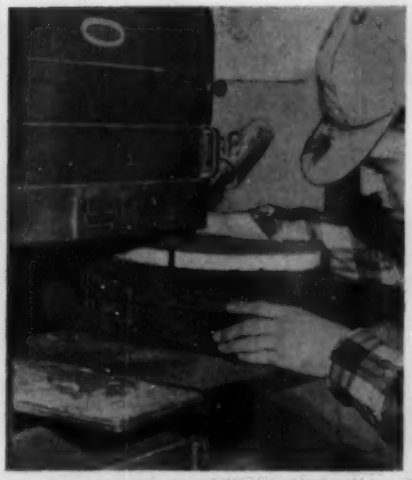


Fig. 5. Cutting the cork to the shape of the base

glue and a medium sized can of plastic wood. We'll talk about paint later.

Enlarge Figure 1 on paper ruled with 1-in. squares. This will give a slightly oversized decoy. The pattern for the baseboard is taken from the top view, the dotted line being the back end of the board. Just leave it with a straight saw cut, as the slant cut for the tail board is made later on. Make 4 saw cuts halfway through the base board, as shown in the front view, Figure 1, to allow for any possible strain caused by glue pull or dampness later on.

Then make the sawing jig, Figures 2 and 2A. This jig is a must and will save time, especially when making decoys by the dozen. It can be made of scrap plywood. It should be a bit larger than the sawed out blank and the blank is centered and held in position for sawing by the keel setting in the slot cut in the base

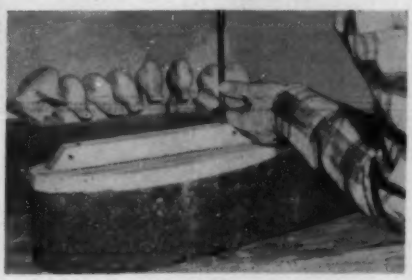


Fig. 6. Fastening on the keels

Fig. 7. Making the top cut using the sawing guide

of the jig. So be careful to have the keels all centered uniformly on the decoy blank. Directions for using this jig are shown in the following photographs.

From drawing, Figure 1, lay out and saw out the baseboards. Use top view drawing. Dotted line at rear should be followed. Be sure to cut the four slots in the bottom. See Figure 3.

Cut pieces of slab cork in approximate sizes and glue up at least a thickness of 4 in., onto each baseboard. Anything over 4 in., will be cut off later on. Use plenty of glue as the cork is more or less porous. Glue should squeeze out all around the edges. See Figure 4.

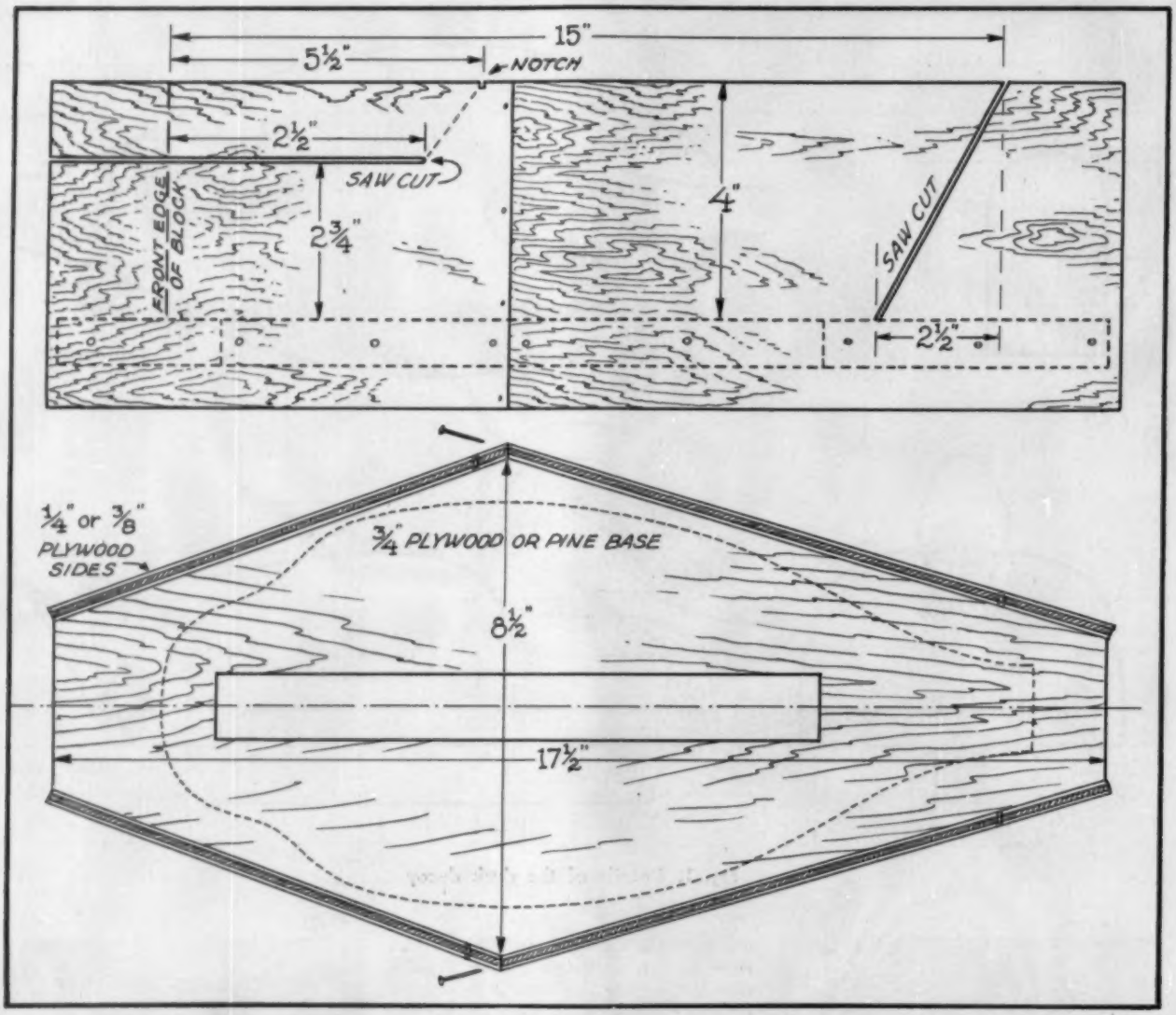


Fig. 2. Sawing jig for duck decoys

Fig. 8. Making the tail cut

Of course, there are several methods of clamping the glued blocks, but this method of clamping six at one time with two furniture clamps did the trick. Again, be sure to use enough glue. Let dry overnight.

Using the base for a guide, make a straight cut all around except at the tail, where you should cut straight out beyond for about 2 to 2½ in., to allow for the slant tail cut later on. Figure 5.

Fasten keels with glue and two 2-in. No. 8 flathead screws. Notice that keel has holes at both ends for anchor cord, so that you can have ducks facing in either direction. Figure 6.

At this point we use the sawing jig. Make the top cut, using the top edge of the jig for a guide. Figure 7.

In making the tail cut, saw right down through the baseboard. Figure 8.

Fig. 9. Making the breast cut

Fig. 11. Fastening the tail board in place

The breast cut is made to the end of the slot in the jig and while the block is still in place, mark or make a shallow saw cut across between the notches. Take the block out of the jig, and make this last cut from the cross mark just mentioned and down to meet the horizontal cut. That's all

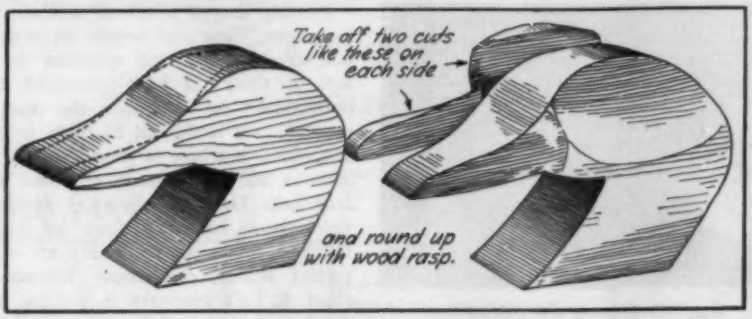


Fig. 14. Cutting out the heads

Fig. 10. Fastening the tail piece in place

Fig. 12. Cutting the silhouette of the head

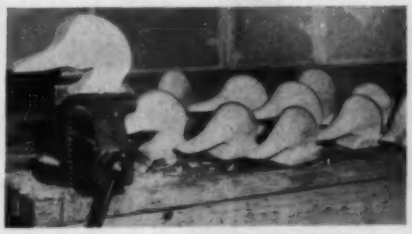


Fig. 13. Shaping the heads

Fig. 15. Shaping the head with a rasp

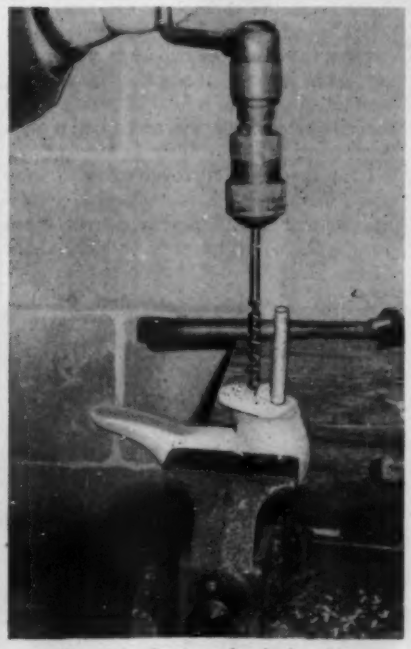


Fig. 16. Boring the holes for the dowels

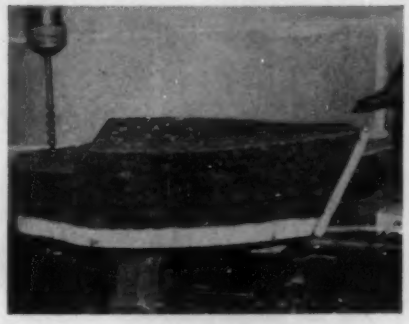


Fig. 17. Boring dowel holes into the body

Fig. 18. Fitting the head to the body

Fig. 19. Shaping the body

for the jig. Put it away for the next batch you will be sure to want to make. See Figure 9.

Clamp in vise as shown and fasten the tail piece with three 10 penny nails and glue. Then one nail is partly driven in for tying. Figure 10.

Since the tail board is set at a slant and cannot be clamped easily, a heavy cord is used instead. Knot cord around the nail and pass it over the neck, down around the breast and back up again. Figure 11.

Cut out both sizes of heads with the grain running with the beak and allow the extra wood below, as shown in dotted lines, to clamp in the vise. This is sawed off after head is shaped. See Figures 12 and 14.

To shape the heads, make two cuts with a chisel to sort of taper the head and cut down the beak to approximately the correct size. Figure 13.

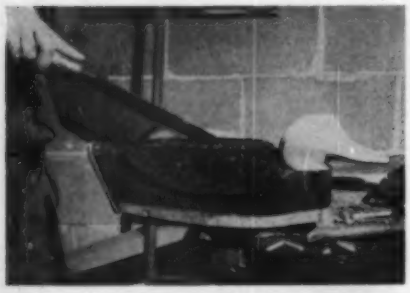


Fig. 20. Rasping the back to shape

The rest of the shaping is quickly done with a coarse wood rasp and finished with a 4-in. hand rasp. This method is easier and faster than trying to whittle them. See Figure 15.

Cut off the necks. Then bore two ⅜-in. holes for dowels and be sure they are parallel and at right angles to the base, as pictured in Figure 16.

In this set of decoys, no two heads were exactly in the same position. To get the holes in the cork to match up with those in the head, some dry plaster of Paris (or any other white powder) was dusted into the holes in the head. The head was then gently placed in position on the cork and given a good tap. Result —a nice white ring on the cork. Bore holes down through the baseboard. See Figure 17.

Set dowels in glue, glue the base, tap down and let glue dry. Figure 18.

Shaping of the body is all done with a coarse wood rasp. First a slight depression is made down the center of the back, as shown in Figure 19. The flaring out to the wing tips is indicated by light dotted line in the top view in Figure 1.

Rasp off the upper edges to the shape shown in the end view of Figure 1.

Now undercut the wings and work out to the tail and right down to the wood baseboard. Also round off the breast so it *almost* meets the neck. See Figures 20 and 21.

Fig. 21. Undercutting the wings

Fig. 22. Closing the openings in the cork

Fig. 23. Giving the decoy the first coat of paint

Fig. 24. Painting the decoys

With a spatula or knife, fill in the larger openings in the cork along the sides with plastic wood. This will prevent water from freezing in these openings when the decoys are taken out of the water in freezing weather. Also make a filler of plastic wood around the base of the neck. Let it dry. See Figure 22.

Give the entire decoy a coat of gray porch or deck paint, thinned with turpentine so that it will penetrate well. When dry, apply a second coat unthinned. See Figure 23.

Painting decoys is not as difficult as it may seem. These boys bought decoy paints, put out by firms that specialize in this sort of thing.* I have retouched these photographs to exaggerate the markings somewhat. It is difficult to show, in black and white, just how to paint them. If you have an old decoy handy, it would probably help. However, the paint dealers in decoy paints put out a chart that may be followed, and since the paints are of the correct shades, one simply follows that chart. It isn't necessary to put too much detail in the painting. It's the general overall effect that counts and the way the ducks ride in the water. See Figure 24.

After the paint has dried, glass, or plastic eyes should be set into holes drilled so that the eyes are flush with the surface. Artificial eyes can be purchased at the paint dealer.

I mentioned "the way these decoys ride in the water." When their heads are set pointing to one side, or when the density of the cork varies, the decoys will have a tendency to ride unevenly in the water. Since no self-respecting duck in good health would sit sideways in the water, some counterbalancing weight will have to be added to the bottom. This is best done at home by floating them in a laundry tub, where your hands won't freeze. Strips of sheet lead tacked to the *high* side are easily tacked onto the bottom.

By the time you have completed a dozen or two decoys, we will have an article for you on making some nice anchors for them.

*Herter's, Inc., Waseka, Minn. Parker Paint Co., 250 Main St., Oshkosh, Wis. Write for catalogs and price lists of paints and dyes.

Floor splinter bothering you? Cut it off at its base and fill the opening with plastic wood. When the filling is hard, sandpaper it smooth and apply a thinned coat of pure, white shellac. — *Shellac Information Bureau.*

The drilling rig, often as high as a 15-story building, is so skillfully engineered that it can lift and lower equipment weighing as much as five locomotives. — *Petroleum Newsnotes.*

Fig. 25. Black mallard hen, mallard drake, and mallard hen

DESIGNED BY STANLEY TOLOCZKO

VOCATIONAL TECHNICAL CENTER

GLEN BURNIE SENIOR HIGH SCHOOL

GLEN BURNIE, MARYLAND

FOLLOW-UP STUDY **VOCATIONAL MACHINE SHOP** **DATE**.....

		DATE OF BIRTH		DATE									CLASS STANDING	RECOMMENDED FOR EMPLOYMENT		COLLEGE		DATE					DATE
				GRADES: SENIOR YEAR														WORKING IN TRADE					
NO.	STUDENT'S NAME	MO.	YR.	MACHINE SHOP	RELATED MATH.	ENGLISH	HISTORY	ELECTIVE	ELECTIVE	CITIZENSHIP	AVERAGE			YES	NO	ATTENDED	DROP-OUTS	PLACE OF EMPLOYMENT	TYPE OF WORK	PROMOTIONS	IN BUSINESS	OTHER WORK	BRANCH OF SERVICE
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Four-year follow-up study chart designed by Stanley Toloczko, Senior High School, Glen Burnie, Md.

WATCH DISPLAY STAND

CLAUDE E. NIHART
Professor emeritus
Los Angeles State College
Los Angeles, Calif.

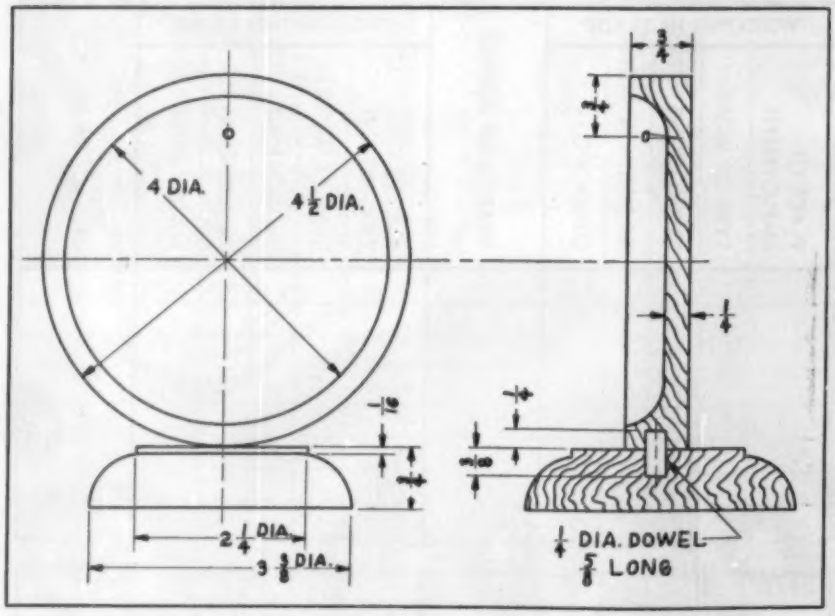
In many homes there are old watches that are family heirlooms. This display stand made of black walnut is an excellent way to show them off.

Suggested Procedure

Before turning the upper section of the stand, glue on a ¾ in. thick piece of soft pine with drawing paper between the two pieces. When the glue is dry, band saw to a ¼ in. larger diameter than the dimension given on the drawing. Next fasten the face plate to the pine side of the stock with No. 10 by ¾ in. FHB screws. After turning and sanding, split the pieces apart with a plane blade placed on the paper line. Scrape the paper off the back of the walnut turning, and sand with the grain. Back the walnut piece used for the base with a ¼-in. piece of pine. Fasten to the small face plate, band saw the two pieces, turn and sand. Bore holes in the two pieces for the ¼-in. dowel. This must be done carefully to insure alignment. Glue up in a bench vise. Stain and finish as desired. If walnut is used, a natural finish is suggested. Drive the escutcheon pin on an angle as shown on the drawing. It is well to drill a small pilot hole to avoid splitting.

Watch display stand by Claude E. Nihart

— Photograph by John La Monica, Los Angeles State College, Los Angeles, Calif.



Details of the watch stand

HOW TO MAKE AND USE A DRY DIAZO DEVELOPING UNIT

LAWRENCE S. WRIGHT
Assistant Professor of Industrial Arts
Iowa State Teachers College
Cedar Falls, Iowa

Probably the most promising of the basic industrial processes used in the reproduction of shop drawings is the dry diazo process.[1] Alert teachers of industrial-arts drafting will not want to be without facilities to at least demonstrate this process. Positive line prints may be made from positive line originals in a matter of seconds and the prints are ready to use immediately as they emerge from the developing chamber. The wide range of sensitized materials available for this and other reproduction processes provides for use in practically every phase of industry.[2] A suitable dry diazo process developing unit can be made in the school shop.

It would have to be admitted at the outset that such a unit is not as efficient as one of the excellent printing and developing units that may be purchased commercially. Another limitation of a home-made unit is that some of the ammonia fumes may be dissipated in the room where the unit is used. These fumes will be very noticeable when concentrated. When used under the same kind of supervision exercised in school chemistry laboratories, the unit can be used quite safely for instructional purposes.

Planning the Developing Unit

The copy that is to be reproduced will determine the size of the diazo paper to be used and will, therefore, determine the size of the developing chamber. The chamber must be high enough to accommodate the largest dimension of the print paper. The diameter must be such that it will accommodate the small dimension of the paper without causing the paper to overlap. For example, 8½ by 11-in. paper would require a chamber at least 11 inches high plus the height from the base plate to the top of the base cylinder. The diameter of the chamber must be of such size as to take the 11-in. dimension without overlapping, say 3⅝ in. or larger.

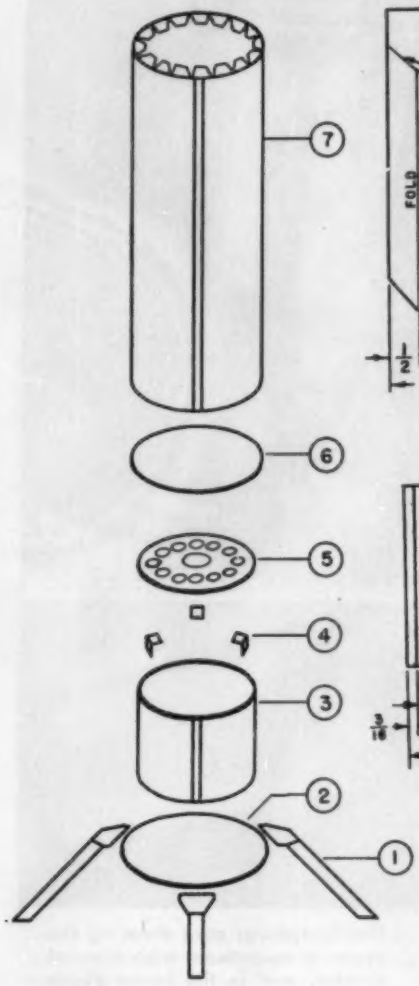
The base cylinder will need to be large enough to accommodate a small jelly glass or beaker. It should also be small enough to allow the vapor chamber to slip over it and come to rest on the base plate. The legs should have a fairly large surface for attaching securely to the base plate. At the same time they should be easy to make and when attached should prevent the developing unit from tipping over.

The vent plate is needed to allow the liberated ammonia gas to rise and to come in contact with the sensitized paper. At the same time, it is this plate that prevents the sensitized paper from falling into the liquid ammonia. Support lugs may be used to keep the vent plate from coming in contact with the ammonia container.

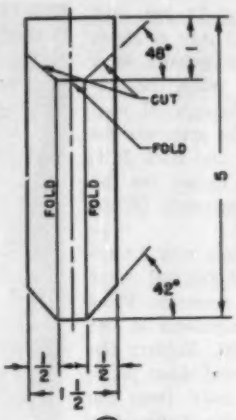
To be reasonably lightweight, fairly thin sheet metal should be used. About 28-gauge metal may be used for all parts except the base plate which should be about 20 gauge. If it appears desirable to make this with-

[1] A survey by Herbert W. Yankee, reported in INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Vol. 44, No. 5, May, 1955, pp. 154–159, shows that of the processes used for reproducing shop drawings, that blueprinting was used by 9 per cent; the ozalid (dry diazo) process was used by 47 per cent; the photostat process was used by 5 per cent; and that these processes in combination with other processes were used by 39 per cent of the industrial plants reporting.

[2] An excellent article discussing the use of this process and other processes suitable for office use may be found in an article written by George A. Travers in *American Business*, Vol. 24, No. 7, July, 1954, pp. 27–41, "And Get Me 100 Copies Right Away."

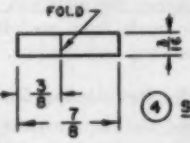


DRY DIAZO DEVELOPING UNIT

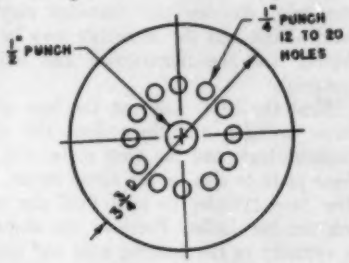


(1) LEG

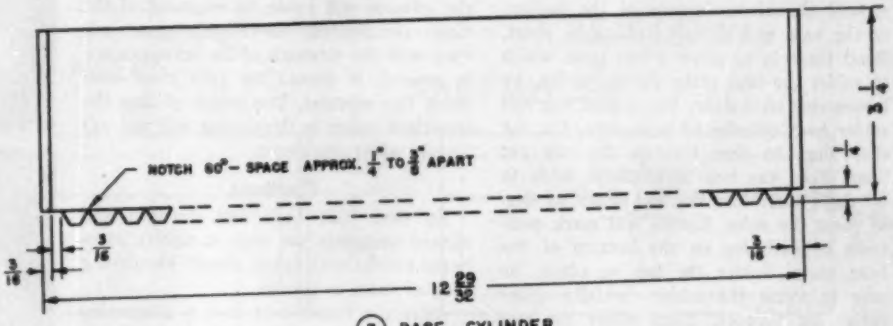
(2) BASE PLATE



(4) SUPPORT LUG



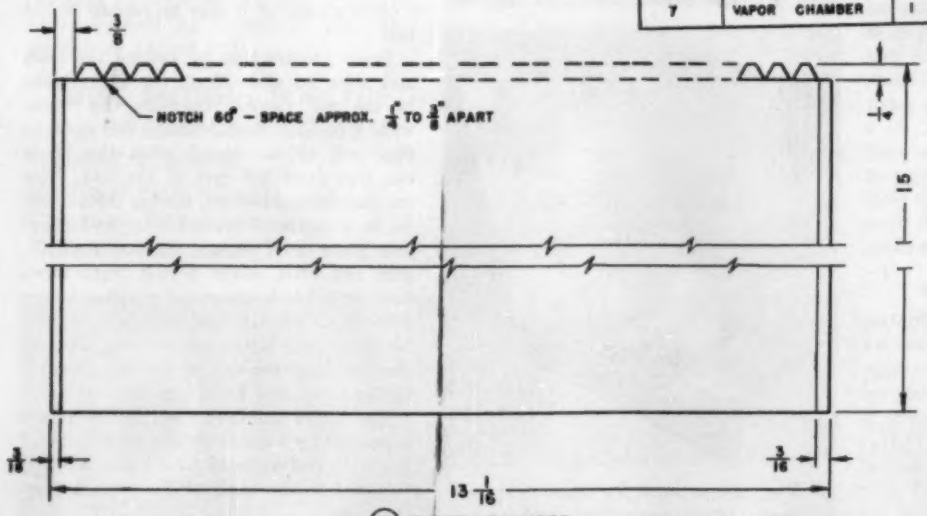
(5) VENT PLATE



(3) BASE CYLINDER

BILL OF MATERIAL

PART NO.	NAME	QTY.	SIZE	MATERIAL
1	LEG	3	26 GA. 1 1/2 X 5	SHEET METAL
2	BASE PLATE	1	20 GA. 4 1/2 DIAM.	SHEET METAL
3	BASE CYLINDER	1	26 GA. 3 1/4 X 12 29/32	SHEET METAL
4	SUPPORT LUG	3	26 GA. 3/16 X 7/8	SHEET METAL
5	VENT PLATE	1	26 GA. 3 3/4 DIAM.	SHEET METAL
6	TOP PLATE	1	26 GA. 3 15/16 DIAM.	SHEET METAL
7	VAPOR CHAMBER	1	26 GA. 13 1/16 X 15	SHEET METAL



(7) VAPOR CHAMBER

(6) TOP PLATE

Details for constructing the dry diazo developing unit, and the bill of materials

out spending any money for materials, the unit can readily be made from re-claimed oil cans, anti-freeze cans and the like.

Constructing the Developing Unit

Having considered the requirements for the unit, sketches and drawings may be worked out and the materials may be selected. See the illustrations and bill of materials.

First the base: Lay out the base plate, base cylinder, the three legs, the three support lugs, and the vent plate. Cut the base plate to size on the circle cutter. Cut the base cylinder to size. Fold the seam on the bar folder. Form in the shape of a cylinder in the forming rolls and groove the seam with a hand groover. Cut *V* notches to a depth of about ¼ in. all around the circumference of the bottom of the base and about ½ to ⅜ in. apart. Bend these in to allow a rim upon which to solder the base plate. Set to 90 deg. by hammering on a stake. Use a good flux and solder base cylinder to base plate. Cut the three legs to size. Cut on the two *cut* lines. Fold the two longitudinal folds to 90 deg.; then fold the end down 48 deg. to meet the sides. Locate and mark positions of each leg on the bottom of the base plate. Solder the legs in place. Be sure to sweat the solder carefully under entire leg support. Then solder the two joints on each leg where the 90 deg. fold meets the 48 deg. fold. Cut and fold the three vent plate support lugs to 90 deg. Locate and mark the position of lugs on the inside of the base cylinder and solder in place. Cut vent plate to correct size. Using a ½-in. punch, punch center hole in vent plate. Using a ¼-in. punch, punch from 12 to 20 holes in vent plate. These holes can be spaced at random.

Finally the vapor chamber: Lay out the vapor chamber and cut to size. Fold for grooved seam. Form into cylinder. Using a hand groover, set the grooved seam. Cut *V* notches about ¼ in. deep in top end of the circumference of the cylinder spaced about ¼ to ⅜ in. apart. Bend over for a support rim for the vapor chamber top plate. Set to 90 deg. on a stake. Lay out and cut top plate very accurately to size to insure a good fit at the top of the chamber. Insert top plate from inside and holding securely in place on a stake, carefully sweat solder in place.

Using the Developing Unit

To expose dry diazo materials a printing machine for any of the basic processes for reproducing shop drawings or a sun frame may be used. Development of an exposed print will take place when the exposure is placed in ammonia fumes. Ammonia (NH_4) is very soluble in water. Water at normal room temperature will absorb well over seven hundred times its own volume of the gas. Full strength ammonia which may be obtained from drugstores is a solution composed of water and about 22 per cent ammonia. This solution will stay at about this strength as long as it remains in a properly stoppered bottle. When the ammonia is placed in an unstoppered container, such as a beaker, the ammonia gas evaporates from the water and rises. It is this ammonia vapor that causes the development of the diazo compounds on the sensitized paper.

The full strength ammonia may be diluted by adding ⅓ part of distilled water to ⅔ parts of full strength ammonia. Place the container of diluted ammonia in the base of the developing unit. Replace the vent plate. Place the exposed diazo paper with the sensitized side away from the curved surface of the cylinder of the vapor chamber. The ammonia evaporating from the solution will cause development of the diazo compounds. Developing time will vary with the strength of the ammonia but in general, it should not take more than about two minutes. The length of time the sensitized paper is developing will not adversely affect the paper.

Cautions

Be sure that both full strength and diluted ammonia are kept in tightly stoppered bottles with labels clearly identifying each of them as poison.

Ammonia fumes will have a nauseating effect when inhaled. Therefore, one should work in a room which is well ventilated. It is recommended that this developing unit be used only under supervision.

Do not get ammonia on the hands. Full strength ammonia is a strong alkalai and will burn the skin.

FLY-SPINNER CASE

C. WAYNE CLOSE
Glendale, Ore.

This fly and spinner case is a handy item for the stream fisherman. He can carry a good assortment of flies and lures in a small space. The case may be slung over the shoulder with a leather strap like a camera case, or it may be hooked to the belt.

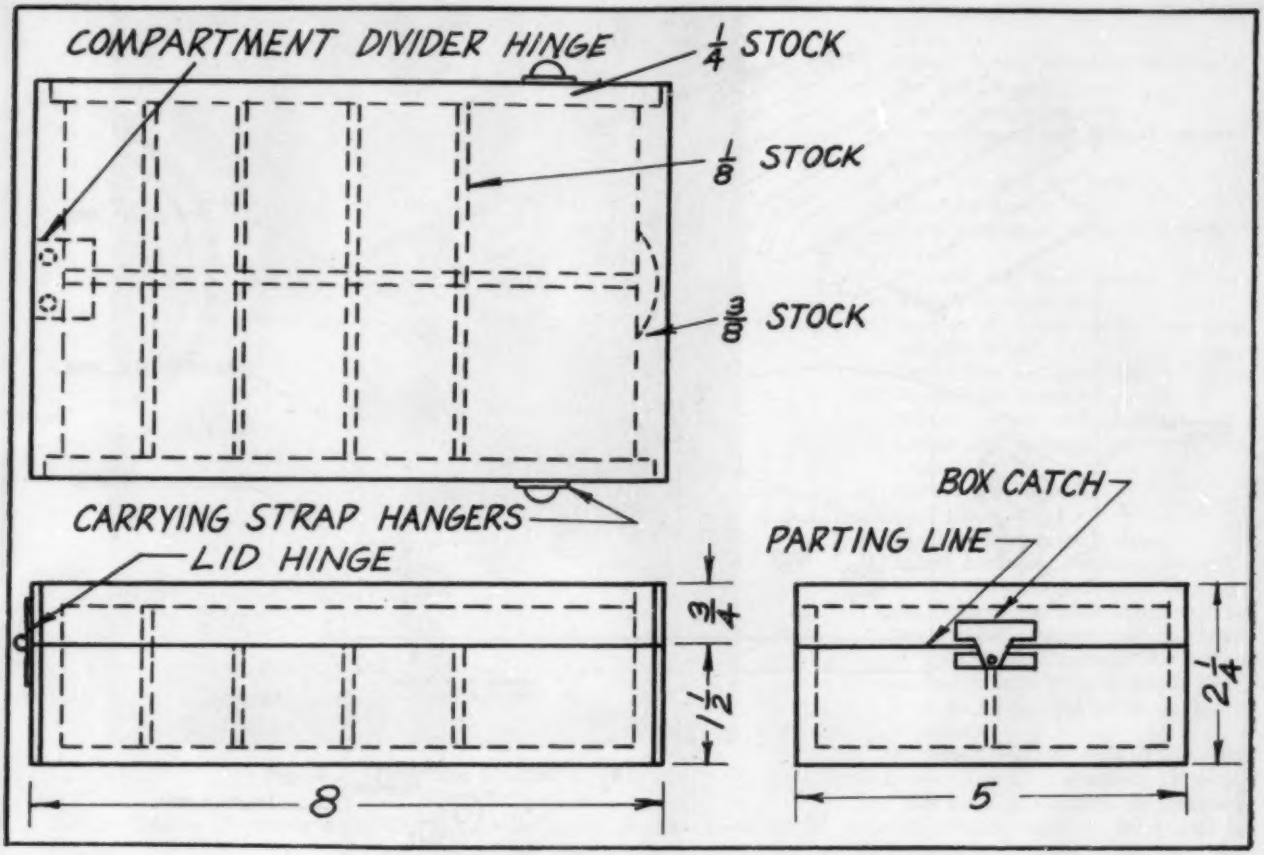
The convenient fly and spinner case, showing upper compartment, the metal divider, and the lower compartment

The fly-spinner case showing the upper compartment with a metal divider, and in the lower photo the closed case

Begin construction by cutting the ends and sides to size. Next, cut the rebates in the end pieces. Assemble the frame with glue and brads. Space the nails so they will all be missed when the lid is cut free from the rest of the box. Now cut the top and bottom, leaving them about 1/32 in. oversize all around. Glue and clamp into place or if clamps are not available, glue and brad. After drying, work down flush with block plane and abrasive paper. Smooth all surfaces and using a thin combination blade in the circular saw, separate the top from the rest of the box. Smooth the saw cut and fit hinges and catch.

The upper and lower compartments are separated by a metal divider. It is made of tin plate and soldered to a hinge which is fastened to the back of the bottom compartment.

In the original model, the top compartment was lined with sheet cork. However,



Construction details of the fly and spinner case

strips of heavy cork spaced about 1 in. apart will serve equally well for hooking flies.

The bottom or spinner compartment is divided into sections using ⅛-in. stock glued in place. Allot proper-sized spaces for items usually carried.

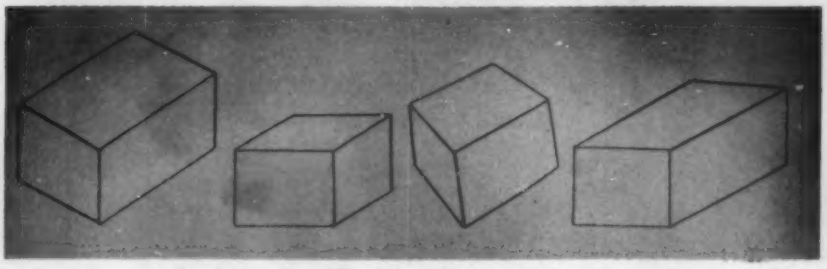
Finish the case with a coat of lacquer sealer followed by 2 coats of waterproof lacquer or varnish.

WIRE MODELS FOR THE DRAFTING ROOM

THOMAS J. MINTER
Northeast High School
Oklahoma City, Okla.

Decorate your drafting room walls with attractive wire models which are educational as well as dressy. Such models can be arranged so as to afford a comparison of the different kinds of representation used in drafting. The illustration shows a rectangular form by such views as isometric, oblique, cabinet, and perspective arranged for purposes of comparison, testing, and demonstration. In teaching principles of design, wire rectangles of various ratios can be used to illustrate proportion. Also, other forms illustrating the principle of balance can be used. Many other worthwhile educational uses can be made of this type of wall display, limited only by the teacher's imagination and ingenuity.

Wire, welding rods, or similar materials may be utilized in making this type of wall model. For a finishing touch as well as contrast with the wall background, apply a coat of enamel of some desirable color.



Wire models for the drafting room

SKI BOOM

Project Research Team:
RICHARD BECKMAN, RICHARD JOHNSON, LYLE MARTIN, DONALD OLSON, HERBERT RIEBE

Directed by:
DR. HERBERT A. ANDERSON
Stout State College
Menomonie, Wis.

(Now with the Stanford Contract Team, Iloilo School of Arts and Trades, Iloilo City, Philippines)

Enjoy America's fastest growing water sport. If you have a venturesome nature that is looking for a new outlet, your're a potential water skier! Once you get your feet wet, and that's all that does get wet after you've passed the novice class, you'll find it grows on you each time you attempt and master a new maneuver. No longer a sport reserved for daredevils and

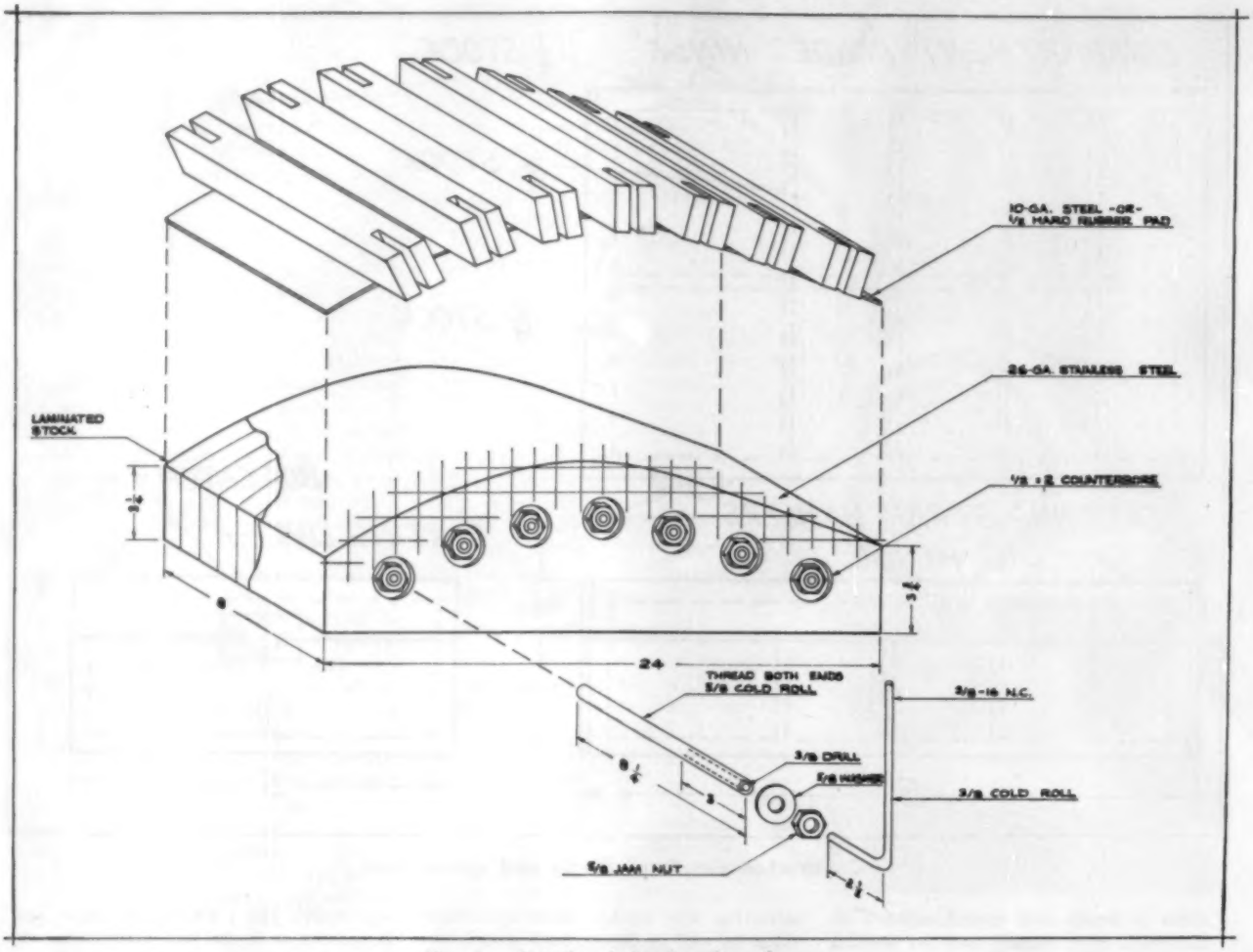


Fig. 1. Details of the bending form

showmen, water skiing has been developed to the point where the average person can enjoy it.

This article contains a step-by-step procedure for making your own water skis and a description of the form needed to bend the tips of the skis. Join the "Ski Boom" with pride as you enjoy water skiing on custom skis that you made yourself!

Procedure for Making Water Skis

1. Get out stock.
2. Joint better side.
3. Surface to thickness.
4. Joint better edge.
5. Rip to 1/16 in. oversize.
6. Joint to finished width.
7. Crosscut better end.
8. Lay out lines on better end for resawing.

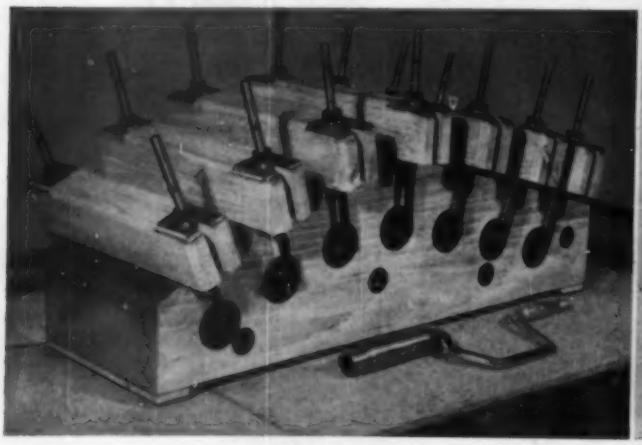


Fig. 2. Bending form

Fig. 4. Applying waterproof glue

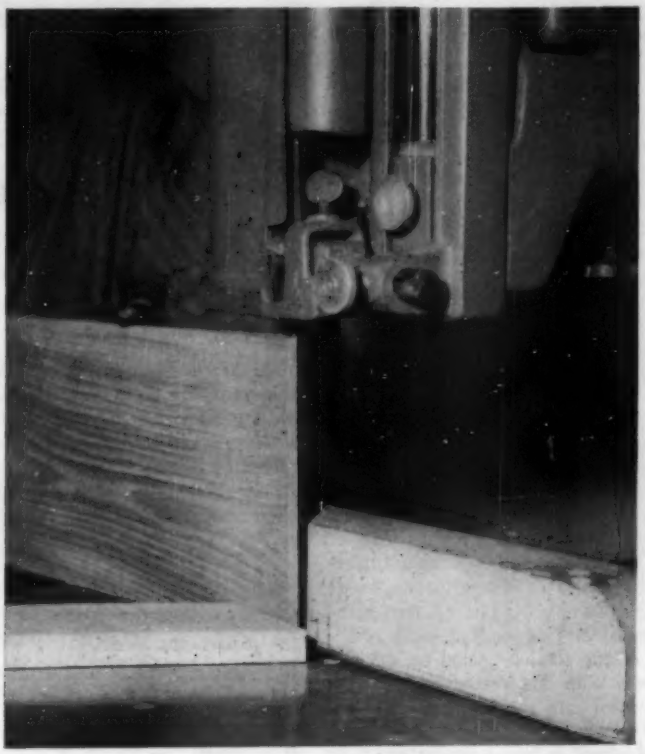


Fig. 3. Resaw the ski blank

NOTE: Observe for proper grain direction.

9. Resaw two or three saw kerfs on better end.
   NOTE: The thicker the stock, the greater number of resawed cuts will be needed. Stagger cuts 13 to 15 in. in length. See Figure 3.
10. Cut veneer to length of saw kerf plus ½ in.
11. Cut veneer to width of stock plus ½ in.
    NOTE: Veneer should be thickness of saw kerf or slightly less.
12. Prepare waterproof glue.
13. Spread glue on both sides of veneer — Figure 4.
14. Place veneer in saw kerfs.
15. Place ski stock in form.
16. Apply pressure on ski stock in form — Figure 5.
17. Dry and cure for 12 hours.
18. Remove ski from form.
19. Bandsaw off excess veneer from front and sides of ski.
20. Layout lines for tip contour.
21. Bandsaw tip contour.
22. Smooth contour with spokeshave.
23. Layout and crosscut ski to desired length.
24. Smooth sides and edges.
25. Ease arrises.
26. Finish with heavy duty sealer.
27. Mount hardware: Bindings, fins, etc.
    NOTE: If a regular runabout or jumping ski is being made, either one or two stabilizing runners must be placed at the aft end of each ski. These may be from 8 up to 25 in. in length, ½ to 1 in. in height, and ½ to ¾ in. in thickness.

The project research team is presently designing a cast alloy aluminum ski form. The team hopes to eliminate the numerous clamping blocks which are being used in the wood form herein described. The aluminum form will be hinged so that pressure may be applied uniformly by a minimum number of tightening devices.

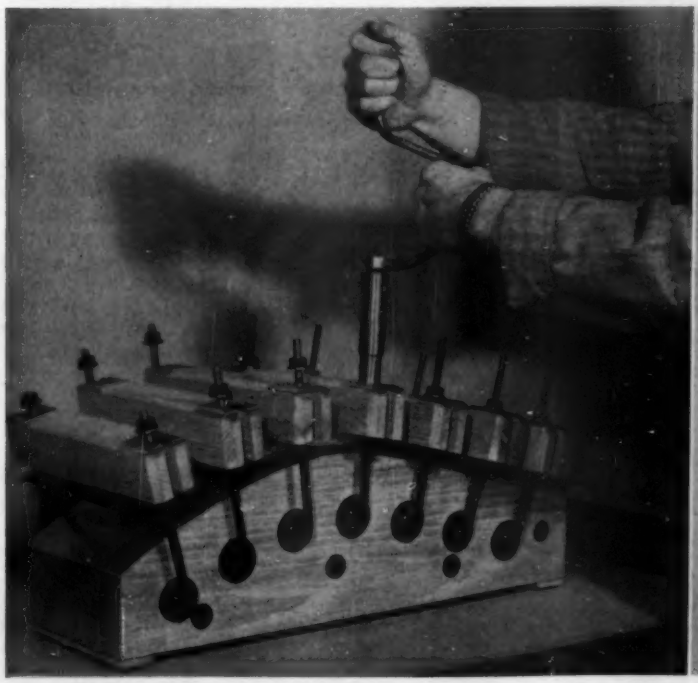


Fig. 5. Bend ski tip. (At right) Fig. 6. Types of water skis — from the left: stepper, turnabout, banana peel, and outboard

SHOP REVENUE COLLECTION SHEET

DONALD D. CHARTRAW
Former Shop Instructor
Laona, Wis.

Practically every instructor in an industrial-arts shop finds it necessary, sooner or later, to collect money from students for shop fees, materials used, breakage, or similar reasons. Often such instances are frequent and the money involved is considerable. In any case, keeping accurate, immediately-available records is vitally important to the instructor if he is to protect himself from criticism and avoid even more severe difficulties.

This article describes the shop revenue collection technique which the writer set up and has used very successfully for the past several years. It provides a simple but conclusive set of records which protect the student as well as the teacher.

To set up this system of financial records, several steps prior to the actual collection of money are necessary. First, at the beginning of the course the instructor stresses the fact that he will not accept money unless his record sheet is available for the student's signature. This eliminates the receipt of money at any time or place other than where an immediate record can be made. Students realize also that their financial transactions are on record and that all money paid into the shop will be channeled into the proper school fund.

Second, as the student prepares to construct any project, he must complete a job plan sheet which provides (1) general information on the student and his project, (2) a sketch or working drawing, (3) a bill of material, (4) the procedure to be used in making the project. This job plan sheet is numbered and will later be filed after completion of the project.

Third, when the student completes his project, he turns in for grading, the job plan sheet and the project itself. It is at this time he pays whatever he owes to the shop, using the following system for the recording and handling of money.

He signs his name in the space provided on the collection sheet illustrated in this article and fills in the other information required. The student's signature is his receipt, showing that he has paid all charges presented to him on an indicated date.

As students usually finish their projects at various times throughout the year, money may or may not be turned into the business office each day, depending upon the administrative policy of a particular school. In the writer's case, he was permitted to hold the money for an entire month and then turn it in to the school office by writing his personal check in the amount of the total indicated on the record sheet. With his personal check, the writer turned into the business office one copy of the collection sheet. In return, the office issued to him a receipt which he then attached to the original copy of the collection sheet. He retained this original copy plus receipt until completion of the school year, when he turned them in with his end-of-the-year report.

Thus the instructor, by means of this system of shop revenue collection sheets, has a complete record of transactions from student to teacher to business office to the end-of-the-year report. This system for recording shop transactions is simple to set up and use. But more important, it will prove of great value in protecting both the teacher and his students in all matters having to do with shop funds.

COLLECTION SHEET

SHOP_____ INSTRUCTOR _____

DATE	STUDENT'S SIGNATURE	JOB PLAN SHEET NUMBER	MATERIAL COST	FINISH COST	TOTAL COST

The shop revenue collection sheet set up by Mr. Chartraw for keeping financial records for his students

THE WOOD WE USE

EDWARD REMICK
Industrial Arts Instructor
C. W. Otto Junior High School
Lansing, Mich.

At a P.T.A. open house exhibit early this year, the following sign was placed on the backdrop of the stage. Because it aroused considerable discussion, we felt that other shops might like to use it or similar types of explanations of their shop work, on like occasions.

Woodwork Explained

W ood is the medium
O bservations are made
O utlines are planned
D esigns are made and studied
W ork is scheduled
O perations are performed
R eferences are checked
K nowledge must be applied
I ngenuity is required
N ovices are instructed
G oal is achieved.

A SUCCESSFUL LUMBER SHORTS RACK

ALBERT A. BETTINA
Associate Professor, Industrial Arts
Eastern New Mexico University
Portales, N. Mex.

The problem of constructing an efficient rack for the storing of the inevitable shorts in the woods area has been a source of frustration for many woodworking and general shop instructors.

The illustrated rack, constructed of three-quarter inch plywood, has served satisfactorily. It was soon discovered that shorts stored in an easily accessible location are readily used up by students on projects, thereby materially reducing the accumulation of *waste* stock.

In order to keep the rack neat and orderly the instructor must: (1) make the pupils aware of the housekeeping problem involved, and (2) make a definite job assignment in his student personnel plan.

The photograph was taken between semesters after approximately 1500 board feet of lumber had been cut up for a variety of projects. The absence of the usual accumulation is due, at least in part, to the type of rack.

The lumber shorts rack

The over-all dimensions are as follows: height, 70 in.; length, 75 in.; depth, 36 in. at the bottom and 12 in. at the top. The openings are 12 by 24 and are planned to accommodate stock from 12 to 36 in. long. The toe board is 6 in. high and sets back 6 in. at the front and 2 in. on the two sides.

All the front edges are faced with ½-in. pine.

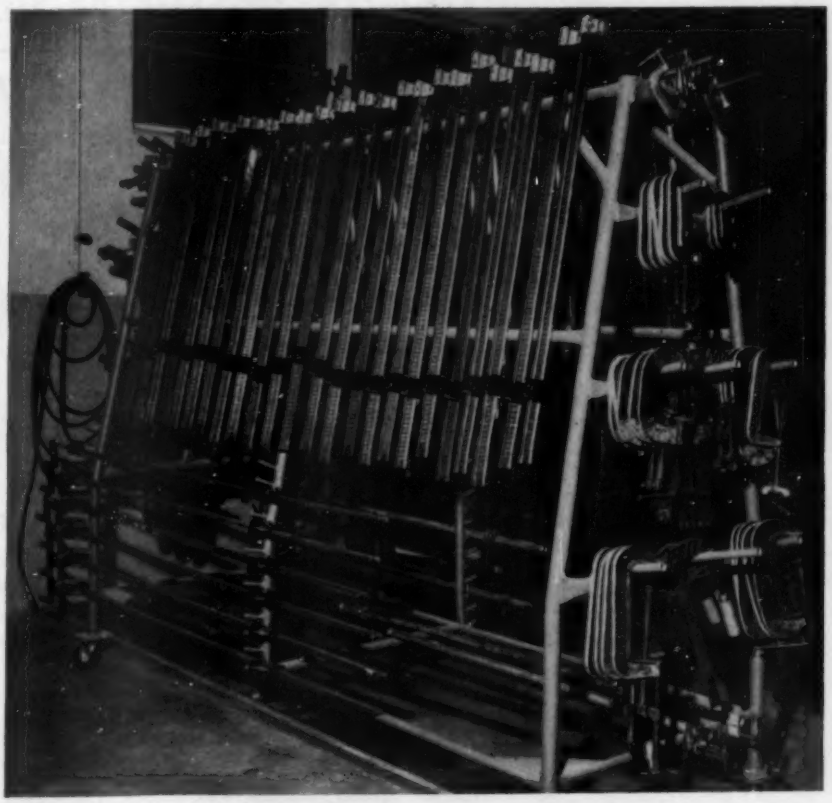
Four inch casters make the rack portable. Since our gluing is done in an open area in a corner of the main shop rather than in a separate room, the rack can be strategically placed to act as a movable partition. The advantages of this arrangement are at least twofold: (1) projects are protected while clamped, and (2) the size of the glue area can be made more compact or enlarged according to the gluing load.

A CLAMP RACK FOR THE WOODSHOP

ALBERT A. BETTINA
Associate Professor, Industrial Arts
Eastern New Mexico University
Portales, N. Mex.

Numerous suggestions for storing clamps have been presented from time to time in our professional periodicals and books. Some recommend a combination glue table and rack with clamps mounted in and around the table. Others suggest various types of wall-mounted permanent racks. All are worth considering provided that the supply of clamps is rather limited.

The rack illustrated herewith was constructed of salvaged pipe ranging in size from ½ to 1½ in. in diameter. It is 8 ft. long and 6½ ft. high. Bar and pipe clamps that are over 36 in. long are stored horizontally while the smaller sizes are placed at an angle as shown. Its capacity is about 75 bar clamps, 60 assorted carriage and quick acting clamps, and about 30 handscrews.



Clamp rack for the wood shop

LAMP BUILDING PROJECT

NORMAND METHOT
Tantasqua Regional High School
Sturbridge, Mass.

In honor of National Electric Week and to commemorate Edison's discovery of the incandescent light bulb, the local electric light company recently sponsored a lamp building project.

The electric light company supplied a complete electric kit for building a study lamp. The kit included a plug, cord, 3-way socket, harp, finial and 3-way 30-200-230 watt bulb for each contest entrant.

In order to enter the contest a student had to design and build a study lamp within 6 weeks after a given date. The electric company supplied all basic minimum and maximum dimensions, including an educational folder on light for each entrant.

The lamps were displayed in the school library and judged by five faculty members using a judge's rating sheet also supplied.

The total number of prizes available to any one school was dependent on the number of entries.

The first prize winning lamp from each school was then sent to a local week long Home Show, to be displayed and compete for the three grand prizes of fifty, thirty, and twenty dollars. The judges for the final judging were representatives of Sylvania, General Electric, and Westinghouse.

In early April all lamps were displayed in a local store window.

Many students have been asked to sell their lamps. Some have agreed reluctantly but at a profit; others want them for their own homes.

The good publicity the industrial-arts department received surely acclaims this as a stimulating and worthwhile community school project.

VERTICAL METAL STORAGE RACK

DONALD L. BILEK
Community High School
Mascoutah, Ill.

Too often valuable space is taken, for storing metals and lumber, that could be put in use for the placement of equipment and working area. This is especially so in the general shop in a small school.

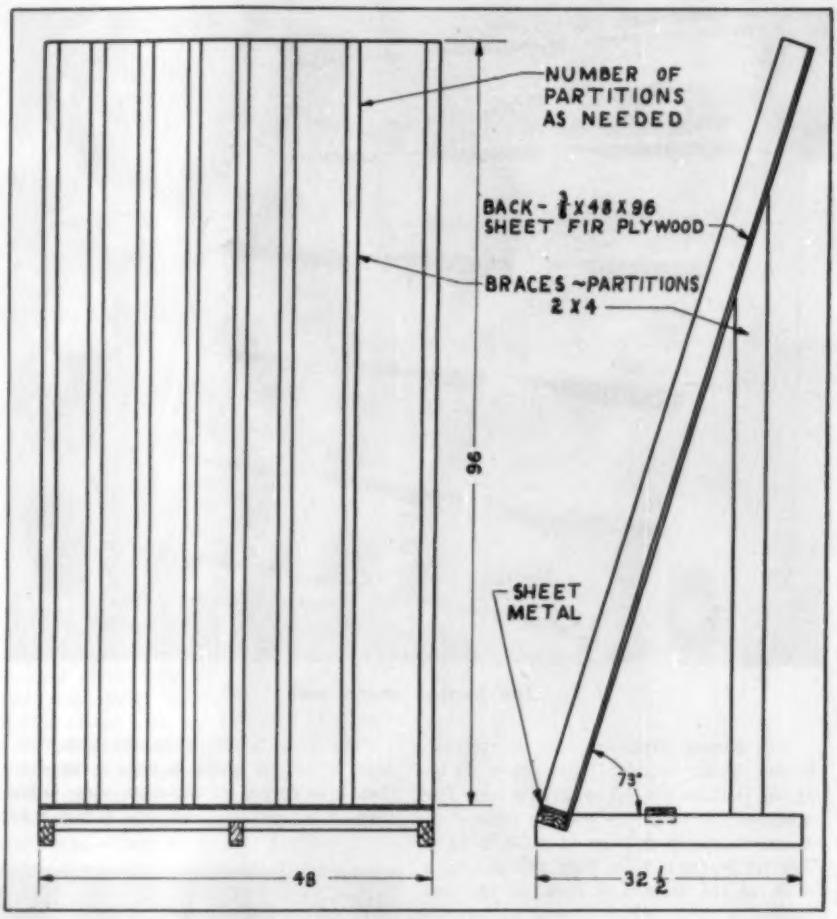
The vertical rack described herewith, greatly helps to curtail this problem. It takes a minimum amount of floor space, but still provides adequate storage space of metals in the metals area of the general shop.

The cost of constructing this rack is held to a minimum by using fir plywood, fir 2 by 4's and a piece of sheet metal or black iron. It can be constructed in a short time.

It has proved to be very satisfactory in meeting the situation. It is neat in appearance, sturdy, places the metals in a position that enables the boy to select his metal easily and quickly. This decreases the time taken to select the material in the making of a project.

In replacing the unused portion of the stock to the rack, the student simply has to place the stock, in a vertical position, in the proper compartment. There is no stooping, bending, or maneuvering to get into position. This greatly reduces the danger of striking some other boy working nearby.

The compartment or space between the back and upright support may be used for storing sheet metals, thus making the rack a compact unit.



Detail drawing of the vertical metal storage rack

ROWAN OR MOUNTAIN ASH

ORVILLE A. OAKS
Wilmette, Ill.

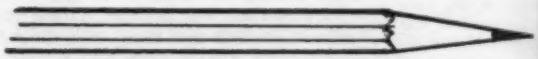
The Rowan or European mountain ash (Sorbus aucuparia) belongs to the Rose family, which includes many of our common fruits such as the apples and cherries. The Icelandic peoples of Finland, Sweden, Norway, and Lapland, the Celts of Scotland, Brittany, and Wales, and even our American Indians considered the mountain ash as sacred and possessed of magical powers. Our native Indians made offerings to the spirits of their departed heroes by throwing branches of other trees around the American Rowan (Sorbus americana). To them, its branches "are eloquent with ghosts of their warrior-sires, who will come at evening, in the chariot cloud, to fire the young to deeds of war." Often, mounds were formed around such trees by their offerings.

Certain Finns and Finnish Laps considered the Rowan Thor's wife — Thor, Norse, and Icelandic God of Thunder — or at least the Thunder Goddess' favorite tree. Their folk-poetry described the tree and its fruit as holy. It also had protective powers against evil spirits, witches, and ghosts. They used its branches as a pillow when sleeping in the forest as no evil could approach Rowan. But, if the sleeper was still afraid, he could run to the shelter of the tree itself for better protection. The Russians also held similar beliefs. Since the spirit of Rowan watches over cattle a Finnish shepherd will occasionally plant a limb in his pasture when he offers protective prayers for his stock. Even as late as 1900 some Finnish peasants held the Rowan as sacred and planted it beside their cottages with every sign of reverence.

In Sweden the Rönn — Swedish for Rowan — is often called *Thor's deliverance* since it once saved his life. During one of his adventures Thor was wading across the river Vimur on his way to rescue Loki, a lesser god, when Gjalp, a sorcerer, suddenly created a flood. A Rönn on the river bank bent over for Thor to grasp and pull himself safely ashore. The Swedish shipbuilder carried over the custom until late in the nineteenth century, of using at least one plank of Rönn in the hull of each ship as the sailors felt it was a protec-

(Continued on page 20A)

Free



Planning Kit from Sheldon!

"Educationally Correct" Help For You In Planning Your Industrial Arts Department

Q-3900 WOOD TOOLS STORAGE CABINET

Stores 278 hand tools of 58 different varieties for a class of 24 students. The new Sheldon planning kit is filled with pictures and information on new furniture such as this.

With this new kit you can plan an Industrial Arts Department tailored to the specific needs of your school and community. It provides you with scale drawing paper, dozens of templates, suggested floor plans, helpful information on factors to be considered in planning, even a complete educational philosophy on Industrial Arts — all this, plus a 56-page catalog of Sheldon "Educationally Correct" Industrial Arts furniture. Please address your request for your free kit on your school stationery. Only one free kit supplied. Additional kits are available at $2.00 each from Sheldon or through college bookstores.

E. H. Sheldon EQUIPMENT COMPANY

MUSKEGON, MICHIGAN

ROWAN OR MOUNTAIN ASH

(Continued from page 234)

tion against storms and watersprites. Since Rönn was Thor's tree. he would look after his own and protect the ship from the wrath of Ran, goddess of the sea. A Rowan tree found growing in the fork of another tree was known as a Flying Rowan, and its branches were used as Divining Rods. So powerful was this Flying Rowan that even chewing a piece of it when out at night protected one from the witches. One Norwegian story relates how some ploughmen were unable to plough straight furrows because of the witches, but one with a plough made of Rowan had no trouble.

The Scottish Highlanders, as did the Welch, used Rowan as a protection for their cattle. A cross of it was placed over the cow shed doors as an assurance for continued freshness, as no witch dared enter where such a cross was displayed. As a double protection the cows were driven through hoops of Rowan to and from the barn. In England the cattle often wore collars of Rowan as a protection against witches and witchcraft, and a cross of Rowan twigs in the churn protected the butter and cheese from their evil. Due to its power against witches and old hags, it was a common thing for old people to keep a small piece of Rowan under their pillow or in their pocket. It was a sacred tree in Wales, every church yard having one; and on special days all the people wore crosses of the wood. The Druids held their rites under its sacred shade, and as late as 1800 stumps of Rowan were still visible about the circles of old Druid temples.

The Rowan, native to Europe and Asia, and naturalized in the United States, is of medium size at its best. The American specie, considered by some as only a variety of the European Mountain Ash, grows from Alaska south to North Carolina and from the Pacific to the Atlantic. Due to its small size the wood has little commercial value. It is used today in Finland when large enough, for joinery work, and occasionally for tool handles and agriculture implements in other European countries. My samples from Finland are light in color, tough and pliable, and take a beautiful polish. The fruit is edible, and the fermented juice at one time was used as a preventative for scurvy and spleen trouble. Our Potowatomi Indians brew a tea from the leaves of both the European and American Rowan for treatment of colds, pneumonia, diphtheria and croup. Rowan is very ornamental with its showy white flowers and large clusters of bright red fruit which remains on the tree until late fall and winter. It was my pleasure in 1939 to see this tree in all its glory of autumn fruits lining the streets of Long View, Washington. Knowing its sacred folklore should make this lovely tree still more attractive as a garden ornamental.

ASSOCIATION NEWS

(Continued from page 12A)

NATIONAL SAFETY COUNCIL

The School and College Sessions of the 45th National Safety Congress and Exposition will be held in Chicago, Ill., October 21 to 25, 1957, at the Morrison Hotel.

Further information may be obtained from *Wayne P. Hughes, director, School and College Division, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

ANNUAL STATEWIDE MEETING

The Colorado Industrial Arts Association met at West Junior High School, Colorado Springs, Colo., on April 5 and 6, 1957, for the annual spring meeting. Approximately 150 members and guests were present.

A dinner meeting was held on Friday evening, followed by two tours. Sherwin Powell, chairman, gave a welcome address and door prizes were awarded. The prizes were made and donated by industrial-arts students of the Pikes Peak area.

The group toured the Continental Air Defense Command Headquarters and Operations Center, and the George Birdsall Memorial Steam Generating Plant.

The Saturday morning session began with registration at 8:30. The shops of West Junior High School were open for visitation, and a variety of exhibits were set up in the gymnasium.

The business meeting was held at 10:15 a.m., with Orlando M. Friesen presiding, and at noon a luncheon was served in the school cafeteria. Morris Johnson was chairman of this meeting. He gave a brief welcome, and F. A. Holmes, head, Industrial Arts and Vocational Education, University of Wyoming, spoke on "The Rip Van Winkle of Industrial Arts."

The past presidents of C.I.A.A. were presented gavels as tokens of appreciation for their service to the organization, and all of the past officers were presented certificates for their service.

In the afternoon, from 1:30 to 4:00, ten workshops were held. Also, four new shops in Colorado Springs schools were open for visitation.

The officers of the Colorado Industrial Arts Association for the coming year are: president — Orlando M. Friesen; vice-president — William R. Erwin, Jr.; and secretary-treasurer — Jess Schmitt. The district leaders are: A. N. Shaw, Kenneth Faulk, Robert Armagast, Jess Schmitt, Arthur Ohanian, and Harry Slater. The safety committee members are: Eric Holland, chairman; Alan Lytle, secretary; O. M. Friesen; Perry W. Knight; and Joseph S. Chick.

ANNUAL PROJECT FAIR HELD

The sixth annual project fair sponsored by the North Carolina Industrial Arts Association was held on May 3 and 4, 1957, at Myers Park High School, Charlotte, N. C.

Dr. S. L. Coover, director of industrial arts, State Teachers College, California, Pa., was the principal speaker at the annual banquet on Friday night. He spoke on the subject, "Skill and Its Relationship to Successful Living."

At the luncheon on Saturday, Dr. Donald Russell, professor of education, Woman's College, University of North Carolina, Greensboro, N. C., was the speaker, and he discussed the importance of various departments of a school understanding and appreciating each other.

A total of 341 projects of high quality were registered representing 35 schools from over the state. The outstanding project of the fair was a dining room suite made by Allen H. Crumpler, a senior at Woman's College Training School, Greensboro, N. C. His instructor was David A. Rigsby.

The winner of the creative design award was Howard Tahquette, a senior at Cherokee Indian School, Cherokee, N. C. His award-winning project was a hand carved door handle in the form of a deer's neck and head. His instructor was Amanda M. Crowe.

The business meeting was conducted by President Robert W. Leith, Myers Park High School, Charlotte, N. C.

The new officers elected for the year 1957–58 are: president, T. C. Shore, Jr., Lexington; vice-president, Kenneth Mann, High Point; secretary-treasurer, Tom Haigwood, Greenville; and executive committee member, Jess Dills, Charlotte, N. C.

NORTH CAROLINA EDUCATORS MEET

The Industrial Arts Department of the North Carolina Educational Association met in Wilmington on March 23, 1957, for their 73rd annual convention. Some 3500 teachers and school leaders met to celebrate the 100th anniversary of the North Carolina Educational Association and the National Education Association.

The Industrial Arts Department of East Carolina College was in charge of the program and exhibits for the State Department of Industrial Arts. A series of demonstrations including pumice and glycerine castings, leathercraft, teaching aids, and instructional devices was presented by East Carolina College students under the direction of H. B. Monroe, assistant professor.

Leaflets containing detailed information on the proper methods involved in these types of work were distributed in an effort to illustrate the simplicity with which these areas may be added to the general shop program. — *Earl L. Barton, Reporter.*

CONFERENCE ON CURRENT PROBLEMS IN LABOR RELATIONS

The Fourth annual conference on Current Problems in Labor Relations was held on the Campus of Cornell University, Ithaca, N. Y., on May 7 and 8, 1957.

The program began with registration at 8:30 a.m. May 7.

At the 9:30 a.m. meeting the subject of "The Taft-Hartley Act After Ten Years: An Appraisal," was taken up.

The speakers were Theophil Kammholz, General Counsel, National Labor Relations Board, 1955–56; Sylvester Petro, professor, New York University; and Clyde Summers, professor, Yale University.

"The Labor Movement During the Next Ten Years: A Forecast" was the topic of discussion at the 2:00 p.m. meeting. Among the speakers was Murray Kempton, *New York Post.*

The speaker of the evening at the 7:00 dinner at the Statler Auditorium was Millard Cass, Undersecretary of Labor, U. S. Department of Labor.

He spoke on "Some Positive Aspects of Labor-Management Relations."

On Wednesday morning at 9:00, "The Role

(Continued on page 22A)

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Here are 15 brand new designs in our Early American Series that make interesting projects of attractive, useful articles. Scale drawings for each design are printed on a separate 8-1/2" x 11" page for a three-ring binder, complete with a picture of the finished project.

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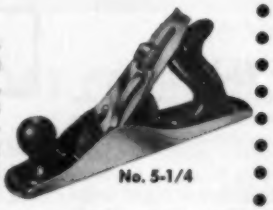

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Stanley Groov-a-matic is the new router guide which fits on the bottom of the router base and allows the user to widen grooves easily after the initial cut without changing the bit or moving the straight edge or batten. Graduations on this cam-shaped guide permit accurate widening by sixty-fourths up to 3/4".

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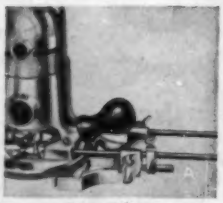

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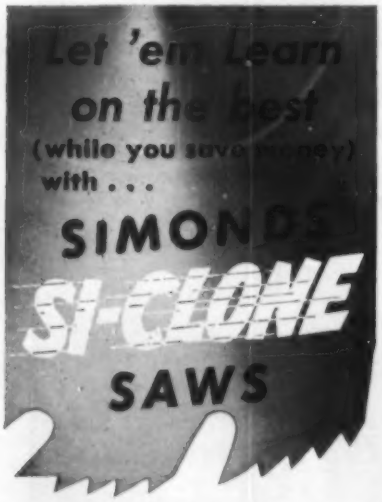

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ASSOCIATION NEWS

(Continued from page 20A)

of the United States in the International Labor Organization," was discussed.

The speakers at this meeting were Leo Werts, Deputy Assistant Secretary of Labor, U. S. Department of Labor; Burton A. Zorn, chairman, Industrial Relations Committee of the Commerce and Industry Association of New York; and George P. Delaney, International Affairs Department, AFL-CIO.

At the noonday luncheon the discussion covered the topic "Collective Bargaining and the Wage-Price Spiral."

NEW OFFICERS ELECTED

The Trumbull County Industrial Arts Association recently elected officers for the 1957–58 school year. They are: president — Sam V. Cipriano, West Junior High School, Warren, Ohio; vice-president — Robert Durst, East Junior High School, Warren, Ohio; secretary-treasurer — Ken Siebenaller, Liberty Township School, Youngstown, Ohio; executive member at large — Boyd Miller, Cortland High School, Cortland, Ohio. Richard Raidel, Brookfield Township School, Brookfield, Ohio, is the outgoing president.

NEW OFFICERS NAMED

William E. James, industrial co-ordinator, Anderson, Ind., was elected president of the Indiana Industrial Education Association at the Association's annual convention in South Bend in April.

Frank Goldman, industrial-arts teacher, Fort Wayne, was named vice-president, and John Hinds, director of vocational education, Elwood, was re-elected secretary-treasurer.

Floyd Dickey, South Bend, is the retiring president of the Association.

NEW OFFICERS NAMED

At the March Spring Convention of the Oregon Education Association, the following officers were elected: president — Al Riendeau, Portland; vice-president — Edwin Hinkley, Eugene; secretary — Floyd Peterson; treasurer — Gordon Asbury, McMinnville; board member, three-year term — Glenn Crisp, David Douglas High School.

OFFICERS ELECTED

The Illinois Round Table Number 11, including Fulton, Peoria, Tazewell, and Woodford Counties, held its annual May breakfast on May 18, 1957.

Bob Newell, of the State Office, Springfield, was among those present.

Officers for 1957–58 for the Round Table are: Dr. Beryl Cunningham, dean of Bennett College, Bradley University; Joel McCraith, teacher, Limestone Community High School; and John Weber, teacher, Manual Training High School.

NATIONAL CONFERENCE ON STANDARDS

The Eighth National Conference on Standards will be held at the St. Francis Hotel, San Francisco, Calif., on November 13 to 15, 1957. The theme of this year's program will be "Standards — Key to Progress and Profits." The meeting will feature at least eleven sessions, the largest number ever offered at a national conference on standards. The subjects to be discussed include nuclear energy, materials handling, electronics, motion pictures, technical publishing, and building.

Some of the sponsors of these sessions are the Association of American Railroads, National Safety Council, American Society of Safety Engineers, American Ordnance Association, American Petroleum Institute, Company Member Conference of American Standards Association, American Society for Testing Materials, Motion Picture Research Council, Technical Publishing Society, and Society of Motion Picture and Television Engineers.

NAVA CONVENTION AND EXHIBIT

The National Audio-Visual Convention and Exhibit was held at Chicago, Ill., July 20 to 23, 1957, as announced by William Birchfield, NAVA Convention Committee Chairman.

The general theme of the meeting was "PR That Pays." The PR stands for Public Relations. Approximately 2500 audio-visual specialists from seven national organizations attended the convention. The program dealt with specific public relations techniques with press, radio, and tv; in advertising; through meetings with school and citizen groups; and in other channels.

Three of the groups conducted specialized workshop sessions.

Among the groups to hold their own sessions during the convention were the Educational Film Library Association, the Chief State School Audio-Visual Officers, and the Audio-Visual Conference of Medical and Allied Sciences. A religious workshop, for church directors of religious education, pastors, and other religious audio-visualists; an Audio-Visual Workshop for Industrial Training Directors; and an Agricultural A-V Workshop for county agricultural agents, vocational agriculture teachers, and agricultural extension workers, also were held during this time.

All events were conducted in the air-conditioned Morrison Hotel.

Personal News

DR. HANKAMMER RETIRES

Dr. O. A. Hankammer, head of the industrial-arts department at Kansas State Teachers College, Pittsburg, since 1945, has retired as head of the department, effective July 31, 1957. He has rounded out 35 years as a staff member in the department, but he will remain on the department faculty after his retirement.

Dr. Hankammer has been instrumental in making KSTC's industrial-arts program one of the most outstanding and progressive in the nation.

Born November 18, 1891 in Van Wert, Ohio, Dr. Hankammer took his elementary and high school training in his home town of Van Wert. He attended Wooster College, in Wooster, Ohio, from 1913–14. He then became principal of the Golden Industrial Institute at Golden, N. C. He is a veteran of World War I, serving as M. S. B., 112th F.S.B., 37th Division where he received a commission. He received his B.S. degree from Kansas State Teachers College, Pittsburg, in 1927; his M.A., from Ohio State University, Columbus, in 1930; and his Ph.D. from Ohio State in 1936.

Dr. Hankammer was appointed as an instructor in drafting in 1922, and in 1926 became assistant professor. In 1929 he became associate professor, and in 1933 was named a professor in the department. He became department head in 1945.

Dr. Hankammer is a member of many pro-

(Continued on page 24A)

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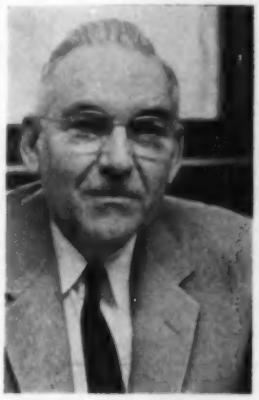
PERSONAL NEWS

(Continued from page 22A)

fessional societies which include National Education Association, American Association of University Professors, American Vocational Association, American Industrial Arts Association, National Association of Industrial Teacher Educators, American Council on Industrial Arts Teacher Education, Kansas Vocational Association, Kansas Industrial Education Association, Kansas Art Education Association, Kansas Academy of Science, and just recently was appointed Kansas representative for the Ford Awards.



Dr. O. A. Hankammer

He has been a speaker on many programs, and is the author of the book *The Art of Block Cutting*. He has written various articles in professional publications and reviewer of the industrial-arts section of *The Dictionary of Education*.

A great many honors have been given Dr. Hankammer which include laureate and honorary member of Epsilon Pi Tau, international honorary scholastic fraternity in industrial arts. He is a member of Phi Delta Kappa; president of the Kansas Vocational Association, 1939–40; president of Rho Field Chapter of Phi Delta Kappa, 1940–41; first vice-president of the American Industrial Arts Association, 1949–50; chairman of the Research Committee of the American Industrial Arts Association, 1954–56. He received first award in the Algoma Plywood Products Designs. He is listed in *Leaders in Education* and *Who's Who in American Education*.

Dr. Hankammer has traveled extensively throughout the United States, and has traveled in Canada, France, and Belgium.

AMMON SWOPE RETIRES FROM TEACHING

Ammon Swope was born in Dayton, Ohio, on September 2, 1886. Upon graduation from high school at Dayton, in 1904, he continued his studies, and in 1912 received his A.B. degree from Mount Morris College, following which he completed three years of graduate work at the University of Chicago, and received the A.M. degree in 1914. His trade experience covers more than five years in the building trades.

His teaching experience began with elementary schools, and later he was a teacher of mathematics and physics and industrial work in high school. He organized the work at Purdue in 1922, and has been there ever since as professor of industrial education, Smith-Hughes Teacher Trainer, and Supervisor of Critic Teachers. He was formerly the

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Ammon Swope

chairman of Trade and Industrial Extension Education. He has been guest professor at the University of Missouri during summer sessions.

Due to Mr. Swope's research activities during the late 1920's which had to do with "The Riding Qualities of the Automobile," and his work as a member of the Committee of the Society of Automotive Engineers, and on the psychology committee on the National Research Council, he was elected to Sigma Xi, the honorary scientific fraternity.

Memberships in professional organizations include the following: American Vocational Association, American Association of University Professors, Society for the Promotion of Engineering Education, The Manual Arts Conference, American Association for the Advancement of Science, American Psychological Association, past president of Indiana Vocational Association, past president of Indiana Industrial Education Association, secretary of Indiana Apprentice Curriculum Committee, national president of Iota Lambda Sigma, and a member and president of the local board of education for three years.

Mr. Swope is a member of various honorary societies, and has been active in public service. He has written and had published many articles in the field of research and on general subjects. His most recent research problem was the national study for the American Federation of Teachers on Vocational Training.

PROFESSOR DACE, EDUCATOR, DIES

Professor Fred E. Dace who had been a member of the Bradley University staff for 37 years, died on May 5, 1957.

Professor Dace, a retired dean of Bennett College at the university, was a member of the industrial-arts staff.

He was graduated from the University of Illinois in 1914 and received an honorary degree in electricity in 1925. In 1939, as associate professor of electricity, he invented a device to receive time impulses sent out by the United States Naval Observatory at Washington, D. C. He was the compiler of a textbook, *Direct Current Electricity*, which was published in 1947, and was the originator of the "little wooden box" designed to save time for students of electricity who were studying the electron tube.

He was also dean of the evening division for 20 years.

Professor Dace is survived by his wife, one daughter, one son; also one sister and four brothers.

DR. HORNBAKE PROMOTED

Dr. R. Lee Hornbake has recently been made assistant dean of the faculties, at the University of Maryland, College Park, Md.

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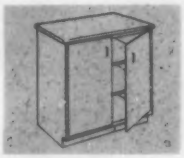

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News Notes

WESTERN MICHIGAN UNIVERSITY

On March 1, 1957, Western Michigan College officially became Western Michigan University.

This marked a rather rapid transition in a mere 53 years from a sparse beginning as a two-year normal school, Western State Normal School, to a place now among universities.

Under the leadership of President Paul V. Sangren for the past 20 years, this campus has shown many aspects of growth — faculty, buildings, land, curricula — all contributing to the raising of new goals and new aspirations.

Western Michigan University has a campus of some 450 acres and 6500 students. Expectations for the future point to rapidly increasing enrollments, with curricula expanded to meet the demands of the time. Serving a dynamic area of 1,500,000 people in Southwestern Michigan, Western Michigan is rapidly becoming a cultural center for the people.

In the past few years departments of occupational therapy, paper technology and others have grown up, and new curricula range from health education to petroleum distribution. Older curricula have undergone sharp revisions and there is a spirit throughout the campus looking to the challenge of the future.

By act of the Michigan legislature in its 1957 session, the name change was brought about. The vote was 28 to 0 in the Senate and 96 to 1 in the lower house. Strong support came from sister institutions throughout the state, and from the governor's office.

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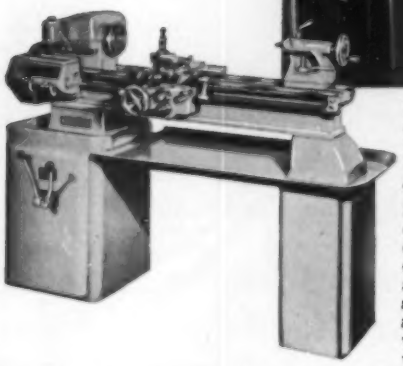

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EDUCATION-FOR-INDUSTRY PROGRAM

A state-wide education-for-industry program, designed to orient students on the high school level to the needs of an industrial economy, was drawn up by Mississippi's leading educators and industrialists at a conference at Jackson, Miss., in the State Building, on Tuesday, April 30, 1957.

In attendance at the conference were delegates from the 28 senior and junior colleges in Mississippi; the State Department of Education, Vocational and Agricultural Division; the Mississippi Manufacturers Association; the Farm Bureau Federation; the Delta Council; Mississippi Power and Light Company; Mississippi Power Company; the Rural Electrification Association; and the Tennessee Valley Authority.

The development of such an industrial education program was requested by Governor J. P. Coleman earlier this year in an address to the Mississippi Agricultural and Industrial Board.

The conference was called by S. E. Corley, state commissioner of agriculture and commerce, who heads a special three-man industrial education subcommittee of the AIB.

Representatives attending the conference outlined a study plan to be introduced into the state schools, and recommendations were made for the industrial orientation curriculum. Also, special action committees were organized at the conference to finalize the course of studies decided on by the group and to direct use of the new curriculum in the state's schools.

INDUSTRIAL ARTS EXHIBIT HELD

Exhibits of outstanding examples of student work were included in a display of the Los Angeles City Schools' industrial-arts program which was held in the State Museum of Science and Industry from May 22 to 26, 1957.

The theme for the exhibit was "Tomorrow's Craftsmen Today." Industrial-arts crafts included were metals, woodcraft, auto mechanics, electrical projects, printing, and drafting.

Shop projects represented the work of students from the elementary grades through junior college. The displays were designed to portray and bring recognition to Los Angeles teachers and their students for the outstanding work being conducted in the Los Angeles city schools' industrial education classes.

The exhibit and accompanying demonstrations were expected to further cement relations between industrial firms and the industrial education program being conducted by the schools.

A total of 33 schools in Los Angeles were represented in the exhibit. In addition each of six firms co-sponsoring the event entered a display illustrating ways in which the training that a student receives in the school shop fits into the processes of industry.

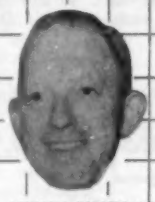
The firms that co-sponsored the exhibit with the Los Angeles Industrial Education Association are Aerojet General Corporation, Foster and Kleiser, Hoffman Electronics Incorporated, Reynold Metals Corporation, Union Oil Company, and North American Aviation Corporation.

NEW COURSE IN METALLURGY

The Milwaukee School of Engineering, Milwaukee, Wis., is adding a new course in metallurgy technology to its curriculum offerings starting with the fall quarter in September, 1957.

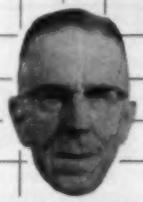
(Continued on page 28A)

BILL CROWL


AUDLEY RISLEY

NORM CROUCH

BOB CRONISTER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NEWS NOTES

(Continued from page 26A)

The course will be an 18-month technical institute type curriculum leading to an Associate in Applied Science degree in Metallurgy Technology.

Several nationally known firms have set up full-tuition scholarships for students enrolled in the metallurgy course.

Under the MSOE Concentric Curriculum system of technical education, a student may continue study toward a baccalaureate degree in mechanical engineering after completing this technician-level course in metallurgy.

The student would first complete six months of metals fabrication study before beginning twelve months of applied metallurgy study.

MSOE currently grants associate in applied science degrees in air conditioning technology and industrial technology, and bachelor of science degrees in mechanical engineering. The school offers baccalaureate and associate degree courses in electrical engineering and technology in addition to the mechanical engineering and technology courses.

New Publications

Graphic Arts Procedures

By R. Randolph Karch. Cloth, 383 pp., 5⅝ by 8½ in., illus., $4.50. American Technical Society, Chicago, Ill.

This is a revised edition of this well-known and useful book on graphic arts procedures. This new edition was prepared in order that the new developments in the fields of optics, metallurgy, chemistry, and electronics could be added to the valuable material contained in the older edition.

The 15 chapters explain how to understand printing processes, know type faces, make layouts, set type, prepare copy and proofread, lock up and impose pages, understand letterpress printing plates, do offset-lithographic printing, understand the gravure and photogelatin processes, do letterpress presswork, understand paper, understand bindery work, get an idea of how the graphic arts have progressed, choose a graphic arts career, and understand graphic arts terms.

Learning Electricity Fundamentals

By Leonard R. Crow. Cloth, 408 pp., 5¾ by 8¾ in., illus., $5.95. Howard W. Sams & Co. Inc., Indianapolis, Ind.

A well-written book which contains many good illustrations. Its 15 chapters contain an introduction to electricity, an explanation of the electron theory; static electricity; electrical fundamentals; fuses and switches; electrical resistance; Ohm's law; magnetism; electromagnetism; work energy and power; transformers; d.c. generators and motors; a.c. generators and motors; circuits and controls; and practical wiring and electrical apparatus.

Radio Operator's License Q and A Manual

By Milton Kaufman. Cloth, 720 pp., 6 by 9 in., illus., $6.60. John F. Rider Publisher, Inc., New York, N. Y.

This is the sixth edition of this helpful book. It is in full accordance with the F.C.C. Study Guide now being used as a basis for radio license examinations. It contains the latest operating procedures and new frequencies. Obsolete questions have been deleted, and questions have been renumbered to make them conform to the latest study guide.

The book also contains appendices on small vessel direction finders and automatic alarms.

Easy Ways to Expert Woodworking

By Robert Scharff. Cloth, 186 pp., 6¾ by 10 in., illus., $3.95. McGraw-Hill Book Co. Inc., New York, N. Y.

This is a book full of clear directions on how to operaate the A.M.F. DeWalt radial-arm power shop.

The information is stated in clear and precise terms and the numerous illustrations are uniformly good.

The 15 chapters present the material under the following headings: introduction to the radial arm machine; basic operation of the saw; dado-head operations; shaper-jointer operations; boring and routing; operation of the saber saw; lathe in action; disk, belt, and drum-sander operations; grinding, buffing, and polishing-wheel operations; shop safety; facts one should know when buying wood; woodworking techniques; wood finishing facts; and workbenches for the radial-arm machine.

Filler Metal Comparison Charts

Paper, 24 pp., 11 by 8½ in., $2. American Welding Society, New York, N. Y.

The American Welding Society announces the publication of a very comprehensive set of welding rod and electrode comparison charts contained in a 24-page, booklet. The brand names of 61 companies are included, 12 AWS-ASTM specifications are involved, and two indexes list brands as well as manufacturers' names.

This series of filler metal comparison charts was developed to supply an international demand for answers to the following questions: What classification is Brand X? Does Brand X come within the same classification as Brand Y? Who makes it? Who distributes it?

(Continued on page 30A)

Now . . . for the first time, the ideal 3-in-1 combination of "Power, Performance, and PRICE" in a unique Router-Plane-Shaper loaded with exclusive features, plus revolutionary new low-cost router bits.

You'll find this new Millers Falls tool is precision built to make it easy for your students to do professional work — and it's priced to make it easy for you to stretch your budget.

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POWER UNIT ✓ Rugged 3 amp. motor ✓ Ball bearings throughout ✓ 30,000 R.P.M. for smoother, faster, cleaner cutting

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PLANE ✓ Big 14" shoe ✓ Outboard arbor support ✓ Micrometer-screw adjustment for front-to-rear shoe and cutter alignment ✓ Direct-reading depth adjusting scale ✓ Notched quadrant for quick bevel cuts (−15° to +45°)

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PLUS . . . a special "package" of exclusive firsts for plastic laminate application!

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McKNIGHT Practical Shop Books!
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BENCH WOODWORKING

(Revised in 1955)

By Fryklund and LaBerge

Completely new text for beginning students above 7th grade. New presentation — new typography — new illustrations — new organization — new projects.

- Covers fundamentals of hand woodworking
- Provides instruction on basic hand-tool operations
- 387 "show-how" drawings and pictures illustrate
- information topics, give details of techniques
- Valuable technical and related information
- All about tools and how to use them, types of occupations, sources of wood, processing.

NOW AVAILABLE IN TWO BINDINGS

CLOTH BOUND, $3.00 PAPER BOUND, $1.50

#7 GENERAL PRINTING

By Cleeton and Pitkin

Recently revised beginner's text includes 10 new units. Covers 90 operations. Numerous step-by-step photographs explain printing procedures, equipment, layout, design, history and occupational information.

198 pages, Cloth bound, $3.00

#8 GENERAL SHOP ELECTRICITY

By Dragoo and Porter

Beginner's text in practical electricity. Includes 26 practical projects to demonstrate applications of electrical theory with explanations of how and why each works. Projects include radio construction and usable home appliances. Many illustrations. $1.50

#13 GENERAL ELECTRICITY

By E. W. Jones

A text to meet the needs of young people for a practical working knowledge of common everyday electricity. Course includes 23 units. Simple and direct in presentation and well illustrated with drawings and photographs. Several shop projects of practical nature.

120 pages, $1.50

#43 APPLIED DRAWING AND DESIGN

By Mattingly and Scragin

A comprehensive beginning text in many practical branches of drawing. Technicalities minimized making it adaptable for less talented as well as talented. Numerous problems. Profusely illustrated.

232 pages, $2.60

#75 GENERAL LEATHERCRAFT

(Completely revised 1955)

By Raymond Cherry

Designs and directions for 31 attractive projects. Detailed instruction for all operations. 356 illustrations.

144 pages, $1.50

#69 CONTEMPORARY METAL HOME FURNISHINGS

By D. G. Lux and E. R. Towers

A brand new book that tells how and shows how to make 58 beautiful metal objects. Not just a project book but complete information on metal home furnishings in modern living . . . how to design and plan the project . . . materials . . . cutting . . . drilling . . . bending . . . oxyacetylene welding . . . finishing . . . and how to proceed.

185 pages, Cloth bound, $3.50

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#9 Principles of Electricity	4.00
GENERAL METALWORK	
#31 Metalwork, Technology and Practice	4.80
#49 Student Study Guide (for above)	1.25
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#55 Teaching Successfully The Industrial Arts and Vocational Subjects	4.50
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#3 Machine Woodworking	3.00

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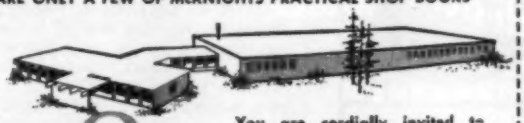

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Attractively priced kits of *extruded* polystyrene and acrylic (plexiglas) sheets—ideal materials for three dimensional forming on a machine like the Di-Acro Plastics Press (not suitable for internal carving or other handicraft uses). Di-Acro sheet materials have an excellent finish and high impact resistance even after forming. Standard thicknesses of .60, .80, .100 polystyrene and plexiglas available in packages of 10, 25, and 50 sheets. Mixed packages of both materials if desired. 10 standard polystyrene colors, 5 standard plexiglas colors.

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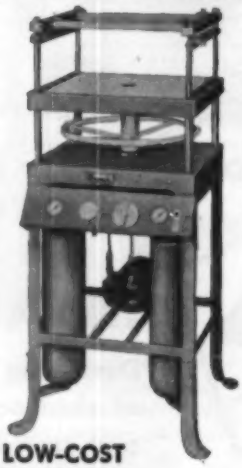
di-acro PRECISION METALWORKING MACHINES

O'NEIL-IRWIN MFG. CO.

351 8th Avenue, Lake City, Minnesota

KEEP PACE WITH INDUSTRY... offer training in plastics this low cost way

NEW, DI-ACRO PLASTICS PRESS FOR SCHOOL SHOPS—ONLY $595.00



This unusual Di-Acro plastics press enables school shops to take plastics out of the purely handicraft stage and to duplicate many creations of the modern plastics industry. The machine will perform all basic operations of the plastics forming industry—mechanical stretch forming, vacuum forming and blow forming.

A unique machine in any school shop, the Di-Acro Press fits well into conventional areas of industrial education. Students can get industrial-type experience from simple machine operation to the most advanced type of three dimensional plastics projects from student-made molds and plugs.

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Forming with the Di-Acro Plastics Press No. 18 makes use of one of the lowest cost materials on the market—the styrenes, in addition to acrylics and vinyls. A variety of colors are available in 18" x 24" sheets of both acrylic and styrene plastics in many thicknesses.

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School_____

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NEW PUBLICATIONS

(Continued from page 28A)

Sixty-one manufacturers co-operated by supplying data on their products. It will prove valuable to those who specify material or who have the responsibility of selecting welding rods and electrodes which come within a given classification.

An alphabetical index lists the brand names and another index lists the full names and addresses of manufacturers.

Third Supplement — Receiving Tube Substitution Guidebook

By H. A. Middleton. Paper, 68 pp., 8½ by 11 in., illus., $1.35. John F. Rider Publisher, Inc., New York, N. Y.

This service aid lists over 1200 receiving tube and more than 200 picture tube substitutions along with wiring changes. It provides some 200 European to American tube substitutions as well as 230 American to European tube substitutions.

This book contains a cumulative index to the tube substitutions in all four volumes of this series.

Shorthand Fashion Sketching

By Patricia L. Rowe. Boards, loose leaf, 9¼ by 12¼ in., Fairchild Publications, Inc., New York, N. Y.

A very helpful book for anyone who wants to be a designer, stylist, consultant, buyer, salesperson, dressmaker, reporter, layout artist, junior executive, patternmaker, sketcher, or co-ordinator.

The book is divided into four sections, the first of which contains seven lessons — the basic fashion figure, front; the basic fashion figure, front half size; the basic fashion figure, three-quarter; the basic fashion figure, three-quarter half size; action and animation; back view of the figure; and dressing the figure.

Other sections describe the clothes for the figure; sketching the head, arms, hands, legs, and feet; reporting fashions; fashion through the ages; and pen and brush strokes.

Standard Grading Rules

Published by Western Pine Association, Portland 4, Ore.

The general instructions contained in this little book conform to American Lumber Standards.

The information covers Idaho white pine, ponderosa pine, sugar pine, lodgepole pine, Engelmann spruce, white fir, larch, Douglas fir, incense cedar, and red cedar.

Chilton's Handbook of Automotive Shop Kinks

Paper, 64 pp., 5⅜ by 8⅛ in., illus., $1. Compiled by The Book Department, Chilton Company, Philadelphia, Pa.

This book contains many kinks that will be very valuable to the mechanic when making repairs on cars manufactured prior to 1952.

Directions are given for repairs on the front suspension, steering, brakes, fuel system, cooling, ignition, engine, exhaust, clutch, transmission, drive-shaft, universal joint, rear axle, electrical system, miscellaneous, body, chassis, on a number of the more popular cars.

Masonry Simplified — Volume II. Practical Construction

By J. Ralph Dalzell and Gilbert Townsend. Cloth, 438 pp., 5¾ by 8½ in., illus., $4.95. American Technical Society, Chicago, Ill.

(Continued on page 32A)

On this...
instructors and students agree

BERGER "ALL-IN-ONE" DRAFTING KITS

All needed drafting tools in one easy-to-carry case.

Instructors like the way these all-in-one drafting kits bring students to class fully-equipped with every tool they need. Sessions get under way promptly without students begging the loan of a neighbor's protractor, a triangle, a scale.

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Protractor	French Curve
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Inner compartments hold drawing and note papers — all in attractive, durable 16" x 24" simulated leather 3-way zippered carrying case of scuff-proof, water-proof Texon with slide-in type handles.

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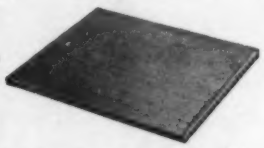

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drawers operate smoothly on nylon glides
lifetime steel construction
lifetime steel footrest
easy angle adjustment
handy reference tray
square tubular legs
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Manufacturers of Lifetime Steel Blueprint Filing Cabinets, Drafting Tables, Tracing Tables, etc.

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How to make a lamp that gives better light

Students benefit most from lamp-making projects when lighting efficiency as well as decorative beauty is considered. To be sure that a table lamp gives good light, the student can be guided by this simple formula:

Subtract the table height (25" for the average end table) from the eye level height of the seated person (average about 40"). The result is approximately what the lamp should measure from the table to the bottom of the shade.

This and other valuable lamp-making facts are described in a 4-page Reference Folder which helps you teach the "Facts of Light."

This folder is part of a program called "Working with Light." It was prepared by the Better LIGHT Better SIGHT Bureau after consultation with representatives of the N.E.A. and others prominent in the field of industrial arts and vocational education.

Specially designed for use in high school and junior high school industrial arts classes, this program includes a 116-page Lighting Handbook, 12 Project Leaflets and the student's Reference Folder described above.

FREE AIDS. For a free copy of the 4-page Reference Folder, use the handy coupon below. For more information about this and other publications of the Better LIGHT Better SIGHT Bureau, consult your local electric service company.

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My Name.....

School Name.....

School Address.....

City.....State.....

My Electric Co.'s Name.....

NEW PUBLICATIONS

(Continued from page 30A)

This is the second edition of this book. It has been thoroughly revised and two new chapters have been added to bring it up-to-date. The material is well written and illustrated.

The eleven chapters explain how to build forms for concrete, design and construct footings, foundations and waterproofing, beams and lintels and their use, column design and construction, chimneys, fireplaces, walls and partitions, septic tank systems, building with SCR brick, and maintenance, repair, and improvement.

Introduction to Electrical Applied Physics

By N. F. Astbury. Cloth, 241 pp., 5¾ by 9 in., illus., $10. Philosophical Library, New York, N. Y.

This book is quite technical and does not shy away from mathematics where mathematics is required.

Its 10 chapters discuss the subject under the titles: The physical basis of the subject, the electrical field, the magnetic field, electrical units and the general equations, the electrical circuit, the magnetic circuit, real circuit components and an introduction to measurements, electromechanical and electro-acoustical systems, electron devices, electromagnetic waves and radiation.

Modern Applied Photography

By G. A. Jones. Cloth, 162 pp., 5 by 7½ in., illus., $4.75. Philosophical Library, New York, N. Y.

An interesting little book which aims to give the reader a general outline of the many applications to which photography now lends itself in the fields of science and industry.

The 12 chapters treat the subjects under the following headings: Photography as an aid to memory, scientific recording, photography by dim and bright light, recording of color, infra-red sensitivity, ultra-violet photography, radiography, atomic particles, recording and analysis of motion, photography in production, and photography as an instructor.

The book also contains a bibliography.

Free and Inexpensive Learning Materials

Paper, 264 pp., 5½ by 8½ in., $1. Division of Surveys and Field Services, George Peabody College for Teachers, Nashville, Tenn.

This is the eighth of a series of books on this subject. It contains 4255 entries which encompass 2510 unchanged old entries, 738 revised old entries, and 538 old entries were eliminated because they were out of print or in short supply.

Chilton's Automobile Repair Manual

By Andrew D. Grey. Cloth, 996 pp., 9⅛ by 11¾ in., illus., $6.95. Chilton Co., Philadelphia, Pa.

This is the 28th edition of this helpful book for beginners and skilled auto mechanics.

It contains over 3000 charts and pictures and it gives directions on how to tune up, pep up, or fix up 23 different makes of cars. The transmission section covers 15 different types of power transmissions.

The general section describes axles, brakes, front end alignment, cooling system, steering, fuel pumps, gauges, generators and regulators, valve lifters, starters and starter switches, tune-up, ignition, distributors, spark plugs, and carburetors.

Say It Safely

By Paul P. Ashley. Cloth, 117 pp., 4⅞ by 7½ in., $2.25. University of Washington Press, Seattle, Wash.

This manual contains much helpful information for writers, editors, and publishers. The author of the manual says that he wrote this little book not to frighten publishers and broadcasters into saying less, but to help them to be more secure in saying what should be said.

The 18 short chapters present the contents under the headings: hazards of libel; when and why; what is libel; keep away from libel per se; intention and mistake; quotations and ads; privilege — who has it?; qualified privilege — practical application; truth, constant, and replies; corrections and retractions; freedom of speech and contempt of court; photographs; right of privacy; radio and television; political broadcasts, danger zones, thirty.

Tractors and Crawlers

By Irving Frazee and Philip V. Eshelman. Cloth, 308 pp., 5⅝ by 8½ in., illus., $7.50. American Technical Society, Chicago, Ill.

Tractors and Crawlers has been written to meet the need for a comprehensive training plan to provide the broad knowledge of principles necessary to the skillful selection, maintenance, and repair of the modern tractor and crawler. Vocational instructors also need this information for both automotive and vo-ag classes.

Design and construction features are covered thoroughly. Chapters are included on suspensions and steering, engines and accessories, power trains, brakes, and hydraulic systems of virtually every major type of tractor and crawler now in use.

Business and Personal News

NEW ADVERTISING MANAGER

Hamilton Manufacturing Company announces the appointment of Al. B. Pupeter as advertising manager. His headquarters will be in the company's main offices in Two Rivers, Wis.

Mr. Pupeter succeeds the late C. D. Ketchum.

NIAGARA MACHINE APPOINTS NOLAND NEW DISTRIBUTOR

The Noland Company, Inc., has been appointed distributor for Niagara Machine & Tool Works in Georgia and Tennessee.

Headquarters of the Noland Company are at 301 West Eighth St., Chattanooga, Tenn. Branch offices are located in Atlanta, Augusta, Decatur, and Marietta, Georgia, as well as Johnson City, Memphis, and Nashville, Tenn.

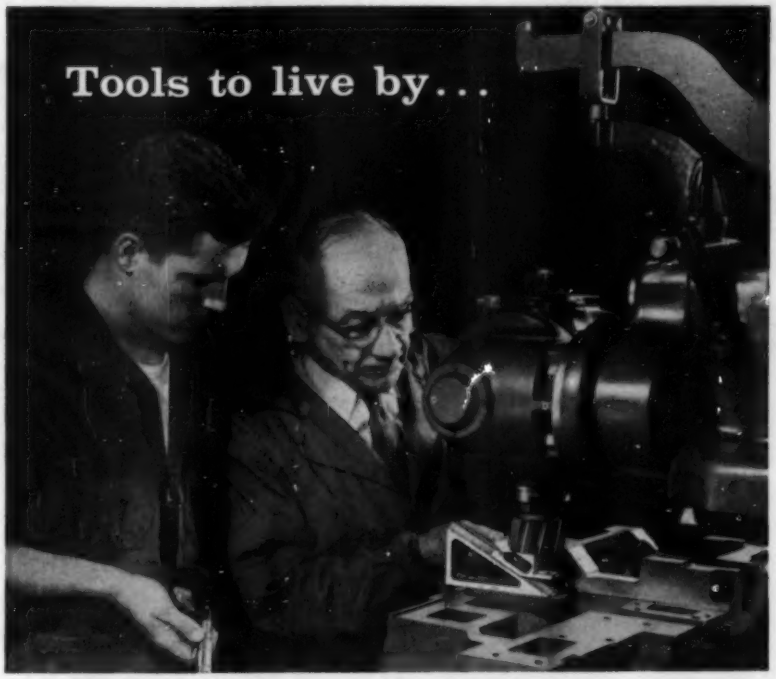
The company will distribute the entire line of Niagara presses, press brakes, shears, and related machines and tools.

NEW SALES STAFF APPOINTMENTS

The L. S. Starrett Company has appointed the following new salesmen:

Richard H. Chace to the San Francisco, Calif., area reporting to James D. Folger; Charles B. Whipps to the Toronto, Ont., Can., area reporting to George L. Whipps; Allan B. Carruth to the Atlanta, Ga., area reporting to Roy M. Peckham, southern sales manager; and Robert J. Carney to the Los Angeles, Calif., area reporting to John E. Holcomb, west coast sales manager.

(Continued on next page)



Brown & Sharpe is proud to offer the young machinist modern precision tools, with up-to-the-minute refinements. They are accurate, easy-to-use, reliable tools that will help him take full advantage of his careful training today . . . will bring out his best work as a skilled machinist in the years ahead.

NEW B & S No. 624 PLANER AND SHAPER GAGE

most accurate gage of its kind for tool setting!

The Brown & Sharpe No. 624 Planer and Shaper Gage (today more properly called "tool setting gage",) is the widest (1⅛") of its kind. Its base and slide are carefully hardened and ground steel forgings . . . with wide, self-aligning, precisely-fitted "V-shaped" ways. It includes a built-in precision level to aid in faster setups.

This B&S Gage offers you more consistent accuracy . . . better parallelism between working surfaces, and greater stability on machine tables . . . than any other tool-setting gage!

Ask your local Brown & Sharpe distributor to show you these fine tools, or write for information. Brown & Sharpe Mfg. Co., Providence, R. I.

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PRECISION TOOLS AND GAGES • MILLING, GRINDING AND SCREW MACHINES
CUTTERS • MACHINE TOOL ACCESSORIES • GEAR, VANE AND CENTRIFUGAL PUMPS

BUSINESS AND PERSONAL

(Continued from page 33A)

BLACK & DECKER TRAINING CLASSES

Black & Decker Mfg. Company, the world's largest maker of portable electric tools, with distribution over the entire free world, conduct training classes, which are designed primarily for training new salesmen and service managers of the company.

Generally lasting for two weeks, the training classes strive to give the new man an insight into the ideals of the company that will make him proud to be a member of this firm.

CHANGES AND APPOINTMENTS AT BROWN & SHARPE

Ronald E. Stenning has been appointed director of education at Brown & Sharpe Mfg. Company.

George N. Levesque, formerly director of research in the machine tool division of Brown & Sharpe Mfg. Company, has now assumed new duties as director of research on a company-wide basis.

Bryan W. Moylan has been appointed sales engineering representative for the Hydraulics Products Division of Brown & Sharpe Mfg. Company. He will be responsible for the development of markets for the company's hydraulic products along the Eastern seaboard of the United States.

New England Territory

Offices for the Machine Tool and Industrial Products field sales personnel have been opened at a new location at 65 Auburn St., Auburn, Mass.

Herbert Richardson, formerly located at Hartford, Conn., is District Sales Manager of this territory for machine tools.

Russell O. Newton, formerly located in Boston, is District Sales Manager of this territory for Industrial Products.

Ohio Territory

Brown & Sharpe has consolidated offices for its Machine Tool and Industrial Products sales personnel at 1577 West 117th St., Cleveland, Ohio. The Industrial Products personnel were formerly located in Cincinnati.

Cleveland is now the sales headquarters for products of the company's two divisions. The personnel from this office are responsible for sales and service in Ohio, eastern Pennsylvania, all of Indiana except the northwestern section, and the entire states of Kentucky and West Virginia.

W. H. Stewart is District Sales Manager for the Machine Tool Division, and F. L. Pritchard is District Sales Manager for the Industrial Products Division.

West Coast Territory

Brown & Sharpe announces divisionalization of its sales organization in the West Coast territory. Headquarters for the company's district sales office is 3040 E. Olympic Blvd., Los Angeles, Calif.

Vernon L. Wade is district sales manager for the company's line of industrial products consisting of precision tools, metal cutting tools, screw machine tools and pumps.

John A. Rinek is district sales manager for the company's machine tools. This office will serve the states of California, Oregon, Washington, Montana, Idaho, Nevada, Utah, Arizona, and New Mexico.

DeWALT, INC., MAKES APPOINTMENTS

Robert A. Hummert, formerly Chicago district manager for DeWalt Inc., has been named Seattle manager for the company. The Seattle territory consists of the entire states of Washington and Oregon and the eleven northern counties of Idaho. Mr. Hummert will make his business headquarters at his residence in Seattle.

Walter W. Leahy has been named to the position of Chicago district sales manager. His territory will include the counties comprising and immediately adjacent to the metropolitan Chicago area (Cook, Lake, McHenry, Kane, DuPage, Kendal, and Will).

William F. Kinderwater, formerly executive director of Junior Achievement of Lancaster County (Pa.), has been named assistant director of public relations for DeWalt Inc. He will make his headquarters at the company's main offices, working directly with A. E. Richardson, Jr., public relations director.

CITATION FOR HIGGINS INK COMPANY

For its 28-year participation in the National Scholastic Art Awards, the Higgins Ink Company, Inc., has been awarded a citation for "distinguished service to the youth of America" by Scholastic Magazines, sponsors of the nationwide art program, and Carnegie Institute, whose Fine Arts Galleries have annually exhibited the winning works of art.

The presentation was made by M. R. Robinson, president and publisher of Scholastic Magazines, and James M. Bovard, president of Carnegie Institute, to Tracy Higgins,

(Continued on page 36A)

read how versatile "boy-proof" machines add interest to your metalworking area
"It's Easy to Bend", an interesting 36 page book that shows how rods, shaps and tubing are formed, tells how a single Di-Acro Bender is tooled for many operations.
The Spartan Model Di-Acro Box and Pan Brake and exactly how it forms many sheet metals into various shapes is fully explained in a 4 page folder.
Cylinders and how to form them in 16 ga. steel on a Spartan Model Di-Acro Roller are covered in the Roller Bulletin.
Fast, accurate cutting of sheet metal, plastics and other materials on the Di-Acro Shear is the subject of a 12 page "Handy Guide".
Advantages of the Di-Acro Notcher in box and pan projects, etc. are told in another 'Handy Guide'.
If you are adding to, or setting up a new shop, you'll also want the latest Di-Acro Specification Sheets.
Pronounced die-ack-ro
di-acro
PRECISION METALWORKING MACHINES
Please send
It's Easy to Bend
Handy Guide to Shears
Spartan Brake Folder
Handy Guide to Notchers
Spartan Roller Bulletin
Di-Acro Spec. Sheets
O'NEIL-IRWIN MFG. CO.
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Lake City, Minneapolis
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School
Address

Don't send your boys to battle with a BROOMSTICK!

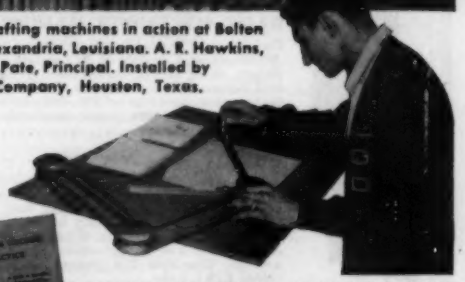
Engineers and Industry Urge

"Teach drafting with drafting machines"

Desk-Topper drafting machines in action at Bolton High School, Alexandria, Louisiana. A. R. Hawkins, Instructor, W. E. Pate, Principal. Installed by Frederick Post Company, Houston, Texas.

UNIVERSAL'S *Precision* DESK-TOPPER DRAFTING MACHINES

Designed and Priced for School Room Use!



FREE TECHNICAL TEXT MANUAL

Write for your free copy of "Drafting Machine Practice" — a 24-page booklet of essential interest to every drafting instructor. (Please include school name and address.)

UNIVERSAL DRAFTING MACHINE CORPORATION
7960 LORAIN AVENUE • CLEVELAND 2, OHIO
Makers of Universal BOARDMASTER–the Drafting Machine Preferred by Industry!

APPROVED AND USED BY SCHOOLS EVERYWHERE

for Record Reproduction *and Blueprint Instruction*

P&H SPEEDMASTER WHITEPRINTERS

In Sizes and Speeds for Every Need and Budget

Schools everywhere find SPEEDMASTER ideal for economical record reproduction, drafting class, shop use and a variety of photo-exact duplicating. The time-saving, work-saving efficiency of these machines has made them the choice of industry, too. With SPEEDMASTER anyone can easily make exact, same-size black-line and colored-line whiteprints of any translucent original. Printing and developing are synchronized. Electronic drive provides instant speed changes with full stop and reverse control.

NEW LOW PRICES! Model 1400CT. Table Model $1295
Model 1400C. Floor Model $1395

Send for free Bulletin No. 57S2

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Progressing with the Reproduction Industry Since 1937
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VEMCO compasses are the finest made

"C-SPRING" Exerts Constant pressure; Prevents Play.
"4-Point Contact" Insures Alignment.
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STEEL THREADED PARTS Insure long life.
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SAMS BOOKS are the most widely used publications for effective instruction in RADIO, TV, ELECTRONICS & ELECTRICITY

OVER 80 POPULAR TITLES AVAILABLE INCLUDING "BEST SELLERS" LIKE THESE...

LEARNING ELECTRICITY FUNDAMENTALS

This remarkably clear book covers the complete story of electricity: historical development; electron theory; static electricity; electrical fundamentals; types and uses of fuses and switches; electrical resistance; Ohm's Law; magnetism; electro-magnetism; work, energy and power; theory, construction and use of transformers; operation and applications of generators and motors (DC and AC); circuits and controls; practical wiring and electrical apparatus. A complete, authoritative, effective textbook. 480 pages; 5½ x 8½"; illustrated. Order *EFC-1*, only.....$5.95

BASIC ELECTRICITY MANUAL

Outstanding course in electricity, planned to achieve maximum teaching effectiveness. Consists of 36 Lessons in Practical Electricity, covering basic theory, laws, terms, magnetism, motors, transformers, lighting, telephones and dozens of other subjects. Includes 13-Projects Section, outlining simple, inexpensive projects which demonstrate theory in action in a practical, interesting way. 264 pages; profusely illustrated; 8½ x 11".
Order *ED-12*, only.....$5.00

BASIC RADIO MANUAL

Widely used comprehensive Training Course. Includes 36-Lesson Section covering basic radio theory, terms, circuits and symbols, components, test instruments, radio transmitting and receiving principles. The 13-Project Section demonstrates theory in action by practical doing; includes construction projects, application of basic laws, soldering practice, demonstration of components and construction. Adopted as standard text by hundreds of schools. Contains 248 pages; 8½ x 11"; fully illustrated.
Order *ED-1*, only.....$5.00

BASIC TELEVISION MANUAL

Invaluable training course for TV instruction. 24-Lesson Section covers oscilloscope principles and application; power supplies; FM carrier waves, discriminators, ratio detectors; antenna principles and design; TV receivers; RF amplifiers and tuners; Video IF, detector, AGC and sweep circuits; cathode ray picture tubes, etc. Project Section includes nine basic projects translating theory into actual practice and so designed as to sustain interest. This effective TV manual contains 280 pages; 7½ x 11"; fully illustrated.
Order *ED-21*, only.....$5.00

COLOR TV TRAINING MANUAL

For advanced students. Covers principles of the Color TV system, including colorimetry, make-up of the color signal; Color receiver circuits (chapters on every type of circuit used in the receiver); Color receiver servicing, including setting up the Color picture tube, alignment, trouble-shooting, test equipment required; also valuable appendices containing equations, vectors, color blocks and colorplates. A comprehensive Color TV training course. 260 pages; 8½ x 11"; profusely illustrated. Order *TVC-1*, only $4.95

PHOTOFACT TELEVISION COURSE

A complete, simple explanation of modern Television principles, operation and practice. Covers Cathode Beam Formation and Control; Beam Deflection Systems; Beam Modulation and Synchronization. Includes analysis of CR tube construction, camera tubes, voltage supplies, saw-tooth generators, sync circuits, control functions, receiving antenna circuits, RF input tuning systems, IF systems, AGC, etc. Fully illustrated; 208 pages; 8½ x 11".
Order *TV-1*, only.....$3.00

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Send me the following books (with 30-day return privilege):

☐ "Learning Electricity Fundamentals"..... $5.95
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☐ "Color TV Training Manual"..... 6.95
☐ "Photofact Television Course"..... 3.00

$.....enclosed. ☐ Bill as instructed

*Name*_____
*School*_____
*Address*_____
*City*_____ *Zone*_____ *State*_____

BUSINESS AND PERSONAL

(Continued from page 34A)

president of Higgins Ink Company, at Pittsburgh, Pa., as part of the Scholastic Art Awards 30th Anniversary ceremonies.

NEW ADDRESS

Parent Metal Products, Inc., have moved to their new office and warehouse at 6801 State Road, Philadelphia 35, Pa.

This firm supplies schools with a complete line of industrial arts and vocational shop equipment of steel including workbenches, lockers and cabinet benches, drawing tables, and storage equipment designed for today's modern school shop.

NEW STACOR PLANT OPENED

Stacor Equipment Company have opened their new plant at 273–285 Emmet St., Newark, N. J. The huge brick and steel building covers 65,000 square feet and is surrounded by several acres of ground. It will house all designing, engineering, and production facilities for Stacor's Lifetime Steel Drafting Equipment which includes Stacormatic single unit work stations, tracing tables, drafting tables, reference tables, taborets, blueprint files, and other equipment for drafting rooms, artists, and schools.

FREDERICK POST AWARDS PRIZE

The Frederick Post Company has presented an award-winning high school senior with all the drafting equipment he will need for an engineering career.

The winner is John A. Malina, Jr., an 18-year-old major in mechanical drawing at the J. Sterling Morton High School, Cicero, Ill.

On April 12–13, 1957, at the annual Illinois Student Project Fair, John's drawings of a pantograph engraver won first prize in the drafting and mechanical drawing division. In the fall semester the pupils in the school's shop courses will actually construct the engraving machine.

Valued at about $100, the prize he won consists of a complete set of Post drawing instruments, a drawing table, T square, protractor, paper, ink, ruler, and pencils.

LINDE COMPANY SPONSORS WELDING CONTEST

Students of 14 Indiana high schools recently competed in an oxyacetylene welding contest sponsored by Linde Company, Division of Union Carbide Corporation. Cash prizes totaling $300 were presented at the spring convention of Indiana's Industrial Education Association in South Bend, Ind. The contest, designed to encourage welding among students, drew a total of 23 different projects, from pot holders to yard carts.

Cash prizes were awarded as follows: for articles, objects, or furnishings for home, yard, or garden — 1st prize — $75 to Larry Tempest, Columbus High School, Columbus, Ind. (windvane); 2nd prize — $50 to David Watt, New Castle High School, New Castle, Ind. (end table); and 3rd prize — $25 to Carl Martin, Columbus High School, Columbus, Ind. (lawn cart).

Useful articles, tools, or equipment for farm or shop — 1st prize — $75 to Richard Morrow, Kokomo High School, Kokomo, Ind. (cylinder cart); 2nd prize — $50 to Arldo Manzo, Washington High School, East Chicago, Ind. (drafting stool); and 3rd prize — $25 to Jerry Maley, Columbus High School, Columbus, Ind. (portable working lamp and kit).

A special "All Show Prize," a Prest-O-Lite No. 420 Welding and Cutting Outfit with a

(Continued on page 38A)

APRONS are a necessity in your shop!

Can-Pro high quality aprons provide economical clothing protection and a neat, uniform appearance of your class. Aprons are not expensive. One apron costs less than a cleaning bill resulting from one shop mishap.

EXPERTLY MADE OF TOUGH, LONG-WEARING MATERIAL

Full cut, properly fitted to protect clothing. Strong tapes. Two roomy pockets for pencils, notebooks, etc. Low cost, Can-Pro aprons have served the schools for over 38 years.

FREE APRONS! *WITH EACH DOZEN APRONS YOU BUY, WE GIVE YOU ONE FREE APRON. USE THESE FREE APRONS FOR EMERGENCY - OR FIGURE YOUR COST ON THE BASIS OF 13 APRONS FOR THE COST OF ONLY 12.*

ALL APRONS SENT PREPAID! 30 DAYS TO REMIT. IF YOU DESIRE, WE'LL CHARGE TO YOUR SCHOOL BUDGET.

ECONOMY DRILL APRONS

Provided with PERSONNEL PLAN CARDS which fit into a cardholder pocket. A set of cards are printed with Supt., Foreman, Safety Engineer, Secretary, Stockroom Foreman, Toolroom Foreman and Maintenance. Both instructor and student will benefit through the use of this educational PERSONNEL PLAN. Develops leadership and respect for authority. Helps the instructor manage a large class by permitting students to handle routine details.

ECONOMY aprons come in TAN, BLUE, GREEN OR ORANGE. Colors can be used to designate different jobs within a class, or TAN can designate woodworking, BLUE metal working, GREEN automotive, etc.

ONE FREE APRON WITH EACH DOZEN!

SIZE	LESS THAN 12	12 TO 24	24 TO 49	50 OR MORE
24 x 28	$1.05	$1.00	$ .95	$ .90
28 x 35	1.10	1.05	1.00	.95
28 x 40	1.15	1.10	1.05	1.00
28 x 45	1.25	1.20	1.15	1.10

1 FREE APRON WITH EA. DOZEN ORDERED

HEAVY DUTY APRONS FOR ROUGH WORK

Without PERSONNEL PLAN CARDS. BLUE denim and BLUE/WHITE hickory stripe denim. 24 x 28 in BLUE denim only.

ONE FREE APRON WITH EACH DOZEN!

SIZE	LESS THAN 12	12 TO 24	24 TO 49	50 OR MORE
24 x 28	$1.10	$1.05	$1.00	$ .95
28 x 35	1.30	1.25	1.20	1.15
28 x 42	1.40	1.35	1.30	1.25
28 x 45	1.45	1.40	1.35	1.30

Prices slightly higher west of Rockies. Sizes shown are "cut sizes" before hemming.

FREE! SHOP ORGANIZATION TEXT BOOK

Included with your apron order. Solves many problems of class management. Tells you how to organize your class just like management system used in industry. Ten chapters - over 60 pages with many illustrations and charts. Well written by shop authorities.

"The School Apron Folks"

EXCLUSIVE INSTRUCTORS SHOP COATS

Designed by instructors. Not sold in stores. Buy on approval! Sanforized and colorfast. Sizes 36 to 46. Blue, Green, Tan, Gray or White.

SC SHOPMAN - Swinging tool pocket. Pencil pocket. Two lower pockets with flaps to keep dirt out. Matching metal snaps. Pleated action back with belt. Side vents. Double cuffs. $7.75 or 2 for $14.95 PREPAID!

LC CLASSMAN - Pencil pocket. Two lower pockets. Box style back with belt. Matching metal snaps. Side vents. $6.50 or 2 for $12.50 PREPAID!

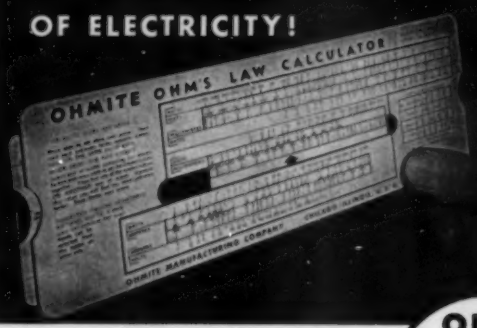
1 SC SHOPMAN AND 1 LC CLASSMAN - $13.75 PREPAID!

(Large sizes available.) (Prices higher west of Rockies.)

CAN-PRO Corporation 29 E. McWilliams St. Fond du Lac, Wisconsin

OHM'S LAW CALCULATOR AND SLIDE RULE

A USEFUL TOOL FOR STUDENTS OF ELECTRICITY!



ONLY 25¢ TEACHERS! ONLY 15¢ each in quantities of 25 or more

A time-saving calculator for your students after they have learned Ohm's Law. Solves Ohm's Law and many parallel resistance problems simply, quickly, accurately—with only one setting. Slide rule scales multiply, divide, find squares, square roots, etc. Only 9" x 3", heavy varnished cardboard, it fits handily into the pocket. Also available in durable vinylite at $1.50.

OHMITE MANUFACTURING CO. 3656 Howard St., Skokie, Ill. (Suburb of Chicago)

GIANT - NEW 1957 ALVIN CATALOG

84 PAGES of the most complete line of . . .

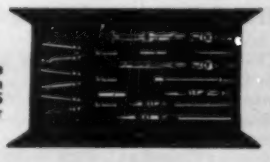
- Drawing Sets
- Drafting Materials
- Drafting Instruments
- Drawing Equipment
- Designing Aids
- Measuring Devices

YOURS FREE!

This new, fully illustrated catalog is chock full of practical merchandise for engineers, draftsmen, architects, designers, students, etc.

FREE ACHIEVEMENT AWARD:

Handsome 12-piece (Square American) Drawing Set with every order over $75. A $25 value . . . perfect prize for the deserving student.



ALVIN

Before you buy . . . See ALVIN CATALOG! Send Today!

ALVIN & COMPANY INC. Windsor, Connecticut

Elmer says:

ELMER'S® GLUE-ALL IS YOUR BEST SCHOOL BUY!

You'll find Elmer's modern plastic glue perfect for your classes. It will bond any porous material such as wood, paper, cloth or pottery. It's easy to apply, fast drying and extra strong. What's more, Elmer's handy plastic squeeze bottles are *easily refilled* and come in sizes 1¼ ozs. to 16 ozs. . . . to fit any hand from kindergarten to shop senior. Order your Elmer's Glue-All from your favorite supplier today. Also available in pint, quart, gallon and 5 gallon sizes for shop use, or for refilling small plastic squeeze bottles.

There's a BORDEN Glue for every job!

ELMER'S® Waterproof Glue

For completely waterproof bonds . . . can be applied to any wood joint subject to water, weather, acids or alkalis. Super bond is stronger than wood itself. It's the glue boating experts use!

ELMER'S® Contact Cement

To bond plastic laminates or vertical plywood wall panels . . . no clamps, nails or presses needed. Highly resistant to heat and water. Available in regular or non-flammable type to meet every need.

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Chemical Division
CPD Dept. IA-47, 350 Madison Ave.
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Please send me literature on:

☐ ELMER'S GLUE-ALL
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*Name*_____
*Position*_____
*School*_____
*Address*_____
*My regular supplier is*_____

BUSINESS AND PERSONAL

(Continued from page 36A)

retail value of about $80 was awarded to Charles Meier, Columbus High School, for his matching end table and lamp entry.

EICO HAS MOVED

Electronic Instrument Co., Inc., has moved to new and larger quarters, effective July 15, 1957. Their new address is 33-00 Northern Boulevard, Long Island City 1, N. Y.

BLACK & DECKER OPENS NEW BRANCH

In its continuing program to provide more efficient service facilities for users of their portable electric tools, The Black & Decker Manufacturing Company announces the opening of a new factory service and sales branch in Washington, D. C. Located at 2353 Rhode Island Avenue, N.E., it will serve Black & Decker users in Washington, and also in the adjacent areas of Maryland, Virginia, and West Virginia.

CHALLENGE EXPANDS LINE OF EQUIPMENT

The Challenge Machinery Company announces the acquisition of the Mayville Metal Products Company line of graphic arts equipment, effective July 1, 1957.

The entire Mayville line, including their well-known galley cabinets, offset filing cabinets, vertical stock racks, and black beauty galleys will be manufactured and sold exclusively under the Challenge name.

Descriptive Material

NEW PUBLICATION ON MOVIE FILM CARE AND STORAGE

Eastman Kodak Company has issued a new, free, publication entitled "The Handling, Repair and Storage of 16mm. and 8mm. Films." It is a 12-page pamphlet, punched to fit the Kodak Photographic Notebook, and provides reference information for schools, libraries, and other users of audio-visual materials as well as for the advanced amateur photographer.

Sections cover possible causes of damage to films and suggestions for inspection, repair, and storage. Special factors for storage of unexposed as well as exposed color films are discussed, and an illustrated page shows how to splice motion picture films.

The new booklet is available through the Sales Service Division of Eastman Kodak Company.

(For Convenience Circle Index Code 0717)

NEW FACTS BOOK ON WOOD FINISHING

General Finishes Sales and Service Company, pioneers in the development of wood treating materials, have made available the revised edition of "Facts on Finishing Beautiful Wood." This manual will be an aid toward the elimination of shop problems as well as showing advantages of finishing wood by either the Sealacell Process of Wood Finishing, or Heavy Duty Arm-R-Seal methods. These methods are the result of the company's long search for a durable, easily applied, protective finish that brings out the true beauty of natural wood.

Highlighting the grain, giving depth and

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

NEED SCHOOL SHOP LUMBER TO START FALL TERM?

WE CAN GIVE YOU *QUICK SERVICE!*

If you need lumber to start your new term—*send us your order today!*

We can ship your requirements—in 17 species and essential special items—from our large stocks of ready-to-ship, kiln-dried Appalachian Hardwoods—*quickly!*

We specialize in School Shop lumber service. We *know* the kind of lumber you need for best results—grades, dryness, texture and workability.

CHECK THIS LIST OF READY-TO-SHIP ITEMS

ASH	RED CEDAR
BALSA	RED OAK
BASSWOOD	WALNUT
BEECH	WHITE OAK
BIRCH	WHITE PINE
CHERRY	WILLOW
CHESTNUT	BALL BAT BILLETS
LIMBA	BIRCH DOWELS
MAHOGANY	DRAWING BOARDS
MAPLE	PLYWOODS
POPLAR	TURNING SQUARES

DIRECT TO YOUR SCHOOL

Wherever possible we ship via commercial truck line right to your school—for safe, clean delivery.

SAVE MONEY!

If your school is in a state east of the Mississippi, or in Arkansas, Kansas, Louisiana, Missouri, Oklahoma or Texas—**we can save you money!** See our catalog 57-S for delivered prices. Catalog sent FREE on request, postpaid.

MAIL US YOUR RUSH ORDER TODAY!

HARDWOOD CORPORATION OF AMERICA

EDUCATIONAL LUMBER DIVISION
P. O. Box 1091, ASHEVILLE, N. C

luster to the wood, the Sealacell process "penetrates" to put the finish into the wood rather than on it. This penetrating action of Sealacell preserves the wood, seals the wood cells, and provides a base for Varnowax, Royal Finish, and Heavy Duty Arm-R-Seal. These highlight the richness, luster, and beauty in the wood itself.

Write for your copy of the facts book. A price catalog of the products furnished by this company is also available.

(For Convenience Circle Index Code 0718)

HANDY MACHINE-SHOP CHART

Chicago-Latrobe, manufacturers of high speed, carbon steel, and carbide tipped drills, reamers, countersinks, counterbores, carbide tools, screw extractors, lathe centers, sockets, sleeves, arbors, glass drills, masonry drills, wood bits, auger bits, power auger bits, and special tools, have prepared a useful chart containing fractional, decimal, letter size, and tap drills. The tap drills are based on 75 per cent of the maximum thread sizes.

Further information is available upon request.

(For Convenience Circle Index Code 0719)

CATALOG OF HIGH SPEED END MILLS

Chicago-Latrobe, designers and makers of carbon, high speed and tungsten carbide twist drills, reamers and special tools, have announced their new 16-page catalog, showing the complete line with prices and dimensions. A technical data section of helpful end mill facts is well illustrated throughout.

A copy of the catalog is available upon request on company letterhead.

(For Convenience Circle Index Code 0720)

NEW CHALLENGE PROOF PRESS BOOKLET

Challenge Machinery Company have just published their new 8-page booklet covering Challenge Precision Proof Presses and their advantages for printers, typographers, and engravers.

Six important applications of these Proof Presses for printers are described in this booklet. This includes reproduction proofing and the direct image proofing of offset or duplicator plates.

Also included is a comparison chart on five leading models showing a comparison of features and a detailed description of eleven important operating features.

Copies can be obtained upon request.

(For Convenience Circle Index Code 0721)

STEWART CATALOG "G"

Stewart Clay Co. Inc., have made available their new catalog, which represents their complete collection of materials and supplies for the plastic arts. It is the culmination of over ninety years of experience in the manufacture and distribution of supplies to those engaged in the various branches of the plastic arts.

This 64-page catalog illustrates and describes their fine line of clays; casting materials; modeling tools; plaster and wood carving tools; armatures and stands; ceramic kilns, clays, glazes, equipment, and accessories; in addition to brushes; stands and cabinets; pottery outfits; mosaics; kits; books; and metal enameling supplies. There is an alphabetical index at the back of the catalog.

A copy of the catalog is to be obtained by writing for it.

(For Convenience Circle Index Code 0722)

(Continued on next page)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

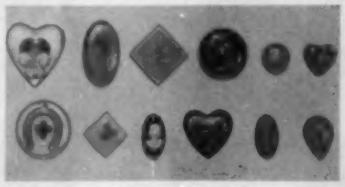
YOU CAN MAKE IT WITH Castoglas

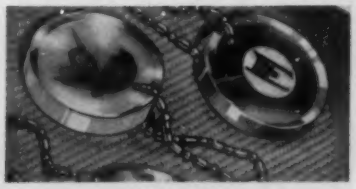
Once upon a time all the skill and experience of a master craftsman would have been required to make the mosaic panel illustrated here. Now, any student interested in creative craft can produce outstanding work with Castoglas, a new liquid resin alloy. Neither heat nor pressure are required. Paper cups and spoons for mixing and measuring are your principal tools. Castoglas hardens within 30 to 60 minutes at room temperature. You create your own colors, any shade or hue desired, including antique gold, silver, copper, by merely mixing pigments with the liquid Castoglas.

Brilliantly colored fall leaves are permanently embedded in Castoglas. The individual tiles were cast in small cardboard molds and then glued to a plywood panel. Cost of materials: 25¢ for the small tiles; 75¢ for the larger tray.

We'd love to show you the candle sconce and mosaic wall panel in all their colorful beauty instead of a black and white photograph. They are easy to make and cost only 45¢ for the sconce and 95¢ for the panel.

"How to Laminate Glass Panels with Castoglas" illustrates the fascinating art of creating this lovely decorative screen. Real butterflies, natural leaves, grasses and flowers were embedded between two Castoglas-impregnated glass mats.





Embedding natural flowers, sea horses, colorful minerals and other unusual objects in clear Castolite continues to be as popular as ever. These are costume jewelry castings ready to be set in mountings of your own design. Jewelry and novelty items are inexpensive take-home projects costing between 10¢ to a dollar.

Illustrated Directions Show How. To help you make the most of using the amazingly versatile Castolite materials, we have prepared a series of tried and tested project manuals. Each one is written with painstaking care to help you succeed from the very start. Select your copy from this list. Better still, order the entire set, save money, and get a firsthand, complete, over-all view of Castolite's true potential in the Industrial Arts field.

☐ How to Cast Tiles with Castoglas..... 10¢
☐ How to Cast Mosaics with Castoglas... 10¢
☐ How to Make Contemporary Jewelry with Castoglas ..... 10¢
☐ How to Make Costume Jewelry with Castolite ..... 10¢
☐ How to Make Novelty Items with Castolite ..... 10¢
☐ How to Mold Chairs with Castoglas... 10¢
☐ How to Form Bowls with Castoglas..... 10¢
☐ How to Laminate Glass Panels with Castoglas ..... 10¢
☐ How to Build Boats with Fiberglass.... 10¢
☐ How to Make Old Boats New with Fiberglass ..... 10¢
☐ How to Patch with Castoglas..... 10¢
☐ How to Cast with Castolite Liquid Plastic. 25¢
☐ How to Earn Money in Your Spare Time. 10¢

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DESCRIPTIVE MATERIAL

(Continued from previous page)

HALLOWELL SCHOOL SHOP CATALOG

Standard Pressed Steel Company announce their Hallowell School Shop Catalog, which covers their complete line of new school-shop furniture. Included in the catalog are a recently introduced drawing table and a tool-storage cabinet, and a wide variety of storage cabinets and racks made specially for school-shop use.

Further information and copies of the Hallowell school-shop furniture catalog are available upon request.

(For Convenience Circle Index Code 0723)

BROWN & SHARPE CATALOG

A completely new Precision Tool and Gage Catalog has been published and is now available from Brown & Sharpe Mfg. Company.

This 96-page, illustrated catalog, designated as No. 36M, covers the company's entire line of Precision Tool and Gage equipment, including several hundred new items introduced for the first time last year.

Copies of this catalog may be obtained upon request.

(For Convenience Circle Index Code 0724)

"BLUEPRINT FOR PROGRESS"

Parent Metal Products, Inc., have released their fall edition of "Blueprint for Progress."

This new 36-page catalog illustrates Parent industrial arts and vocational shop equipment of steel — a complete line of workbenches, locker and cabinet benches, drawing tables, and storage equipment designed for today's modern school shop.

(For Convenience Circle Index Code 0725)

GREENLEE TOOL CATALOGS

Greenlee Tool Company have produced their latest catalogs No. 34-M and 35-H.

When Greenlee Bros. & Co., of which Greenlee Tool Company is a division, was established in 1866, its first product was woodworking machinery. Over the years it has been one of its most important lines, although no attempt has been made to build such machinery for every purpose. Instead, there has been intense specialization on certain types for mortising, tenoning, boring, planing, shaping, and sawing.

Catalog No. 34-M illustrates and describes mortising and boring tools.

Catalog No. 35-H covers tools for woodworkers.

A third catalog, No. 35-E covers tools for electricians, plumbers, and construction.

For further information write to the manufacturer.

(For Convenience Circle Index Code 0726)

PLASTICS CATALOG AND PRICE LIST

Cadillac Plastic and Chemical Company have made available a 14-page book, which is a complete catalog and price list of materials for Fiberglas reinforced plastics.

The catalog lists Fiberglas cloths, tapes, chopped strand mats, surface and overlay mats, rovings, chopped strands and milled fibers, polyester resins, epoxy resins and hardeners, MEK and benzol peroxides, pigment paste dispersions, diluents, accelerators and parting agents, along with sizes, grades, and prices.

Copies are available upon request.

(For Convenience Circle Index Code 0727)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

Let Your Students Learn On

KELLER POWER HACKSAWS

"Industrial Equipment for the School Shop"

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4 features for teaching

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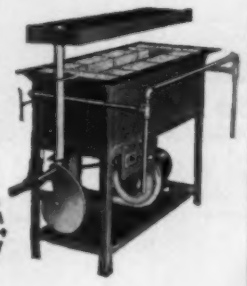
NO. 133 FORGE FURNACE



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NO. 133 FORGE FURNACE...
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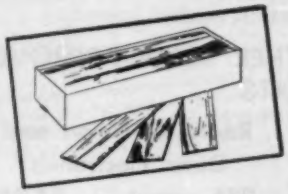

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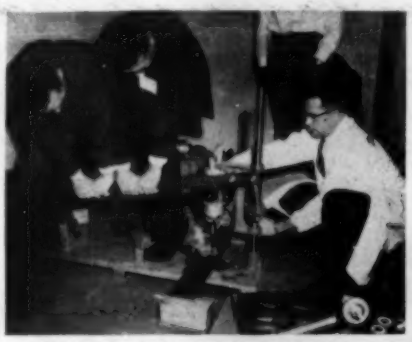
Shop Equipment News

HEAVY-DUTY DRILL DEMONSTRATED

Black & Decker Mfg. Company conducted a demonstration of their new ½-in. Heavy-Duty Drill. This demonstration was repeated several times for various groups, always with the same result.

First a ¾-in. twist drill was adapted to this unit of normal ½-in. capacity. The drill was secured in a Black & Decker No. 60 Drill Stand. The resulting drill press was fitted with a specially extended handle that gave an approximate leverage of 8 to 1. Then, with the drill in operation, two men who each weighed over 200 lb., attempted to stall it by applying their full weight to the special handle, driving the bit into a piece of ½-in. steel plate.



Drill under 3,000 pounds pressure

Weight on the ¾-in. drill bit was over 3000 lb. The bit went through the steel in less than five seconds. The drill did not stall.

Shown in the photo are Ernie Nagy and Scotty Rolston, sales representatives of Chicago area, applying pressure, and Alex Dahl, applying lubricant oil to the job.

(For Convenience Circle Index Code 0701)

THE NEW MIDGET HI-FLO

Brown & Sharpe Mfg. Company announces a new vertical submerged type centrifugal pump called the "Midget Hi-Flow." The pump is equipped with an integral ⅛ horsepower 3-phase or 1/10 horsepower single phase motor. The motor is totally enclosed with a N.E.M.A. standard flat face mounting and is designed for continuous duty.

New Midget Hi-Flo

The unit is designed for immersion in liquid to a depth of 5¾ in., with the motor mounted 2 in. above the maximum liquid level. The liquid flows from the impeller through two cored passages within the pump body, with a ½-in. pipe connection above the mounting flange.

This pump is suitable for supplying coolant for machine tools and light machinery, for use where dirt or abrasives may be present in the liquid, and for light transfer work.

Pump specification sheet P 9 will be sent on request.

(For Convenience Circle Index Code 0702)

HEAVY DUTY PANEL CUTTING MACHINE

A new heavy duty panel cutting machine, capable of a 62-in. cutoff stroke and available in models ranging in horsepower from 3 to 10, has been introduced by DeWalt Inc., a subsidiary of American Machine & Foundry Company.

Heavy Duty Panel Cutting Machine

As shown, the DeWalt panel cutter can be used on large dimensioned ferrous materials such as this subway grating. The machine is also ideally suited for the cutting of non-ferrous metals, plywood panels, and large sheets of other materials such as plastics and composition boards.

The basic design of the new machine is a deviation from DeWalt's normal product, radial arm saws. The panel cutter, instead, substitutes two vertical columns suspended between which is a single "arm" supporting the cutting mechanism, thus allowing increased dimensional travel of the blade.

In addition to its primary use for straight cutoff work, the panel cutter can also be used for bevel cutting or ripping by simple adjustments of the motor carriage.

Complete information is available upon request.

(For Convenience Circle Index Code 0703)

SPARTAN MODEL BOX AND PAN BRAKE AND SPARTAN MODEL ROLLER

O'Neil-Irwin Mfg. Company announce their completely new Spartan Model 24 Di-Acro Box and Pan Brake, designed especiallly for school shops. Maximum forming width 24 in.,

(Continued on page 44A)

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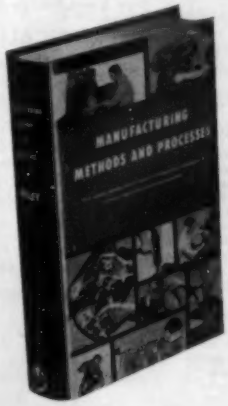

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SHOP EQUIPMENT NEWS

(Continued from page 42A)

material capacity 16-gauge mild sheet steel, maximum depth of box or pan 3 in., clearance through top opening 1 in., box fingers are undercut ½ in. (for forming boxes and chassis with lipped edges), maximum bend (one operation) 135 deg., box fingers graduated in size to cover forming range from ¾ in., to 24 in., in steps of ¼ in., net weight 225 lb.

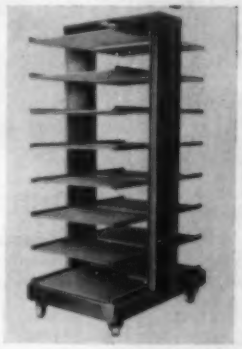
Also designed especially for school shops, the Spartan Model Di-Acro Roller is built to machine tool standards and tolerances. Precisely machined bearings and 2-in. diameter rolls turned by machine cut gears provide maximum ease of operation and accurate reproduction when duplicating pieces. Gears are enclosed for extra safety. Five models from 12 in., through 36-in. length, material capacity from 22 to 16 gauge depending on model, diameter of rolls 2 in., minimum radius 1 in., maximum radius no limit.

Complete information on Spartan Brakes and Rollers available on request.

(For Convenience Circle Index Code 0704)

VERTICAL STOCK RACKS

Challenge Machinery Company have announced their new Challenge Vertical Stock Racks which provide 30 to 40 square feet of handy storage space in just a few square feet of floor space. The stock rack insures an easy way to handle numerous stacks of paper and keep them separate, particularly in connection with printing, duplicating, collating, or binding operations.



Vertical Stock Rack

In addition the stock rack is portable. It is equipped with rollers so that jobs can be easily moved from place to place when fully loaded. The rack is available in two sizes — Model A with 20 by 27 inches of space on each level, and Model B with 22 by 34 inches. The shelves are of masonite with the racks themselves of heavy gauge steel. They are designed to take a full load of paper on all shelves.

Complete information is available upon request.

(For Convenience Circle Index Code 0705)

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(Continued on page 46A)

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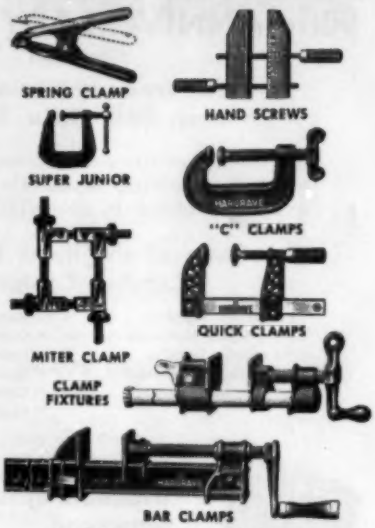
The Complete Line of Tested TOOLS



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METAL ENAMELING KILN

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SPECIFICATIONS

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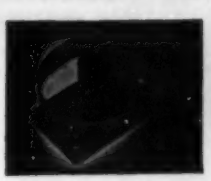
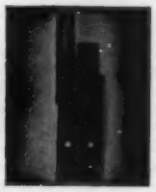


Formit



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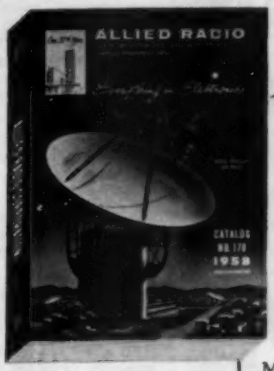

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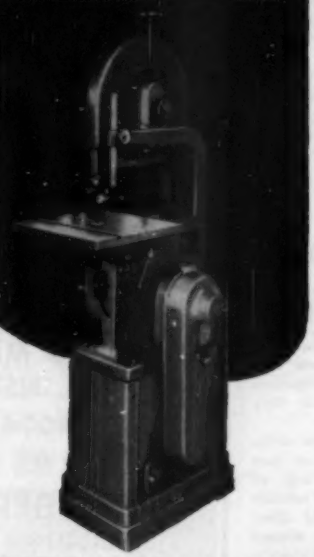

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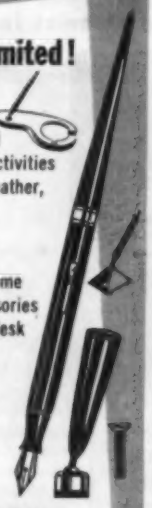

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SHOP EQUIPMENT NEWS

(Continued from page 44A)

severity and character of the accident; (3) type of circular saw on which accidents occurred with lesser or greater frequency; (4) dimensions of various elements incorporated into the design of each of the many types of circular saw tables.

Harry K. Jordan, woodworking expert and safety consultant, is supervisor of the new Casualty Research Department which has been established.

The results of Mr. Jordan's findings are now available as a public service without charge to any industrial company, school, insurance company, government agency or institution wishing to avail itself of the information.

The material from which Mr. Jordan's staff drew in order to reduce an unusually complex problem to a workable mathematical formula consisted of information received from over 10,000 circular table-type saw users.

Further information will be furnished upon request.

(For Convenience Circle Index Code 0706)

SOUTH BEND DRILL PRESS TRAY

A handy tool tray designed especially for their 14-in. Precision Model Drill Presses has been developed by South Bend Lathe. Made entirely of aluminum, the tray clamps around the 2¾-in. drill press column. It is easily adjustable to any height or position, either above or below the drill press table.

Use of the tray contributes to the efficiency and safety of drill press operation. It provides a handy place for small tools, extra drills, and other accessories. It eliminates the tendency to lay tools on the drill press table which is a great temptation, especially with the floor type drill press.

Complete information on this tray is available.

(For Convenience Circle Index Code 0707)

NEW SLIDE-SOUND COLOR FILM AND FILM BOOKLET

Another new, slide-sound, color film kit "Regulation and the Charging Circuit" has been added to the Delco-Remy film library. It consists of a 35mm. color film, a 12-in. record, and a leader's guide containing suggested meeting procedures. "Regulation and the Charging Circuit" shows with simplified illustrations the internal construction and operation of a battery, generator and regulator, and explains in nontechnical terms how these units work together as a team to make up the charging circuit in the modern automobile. Running time is 12 minutes.

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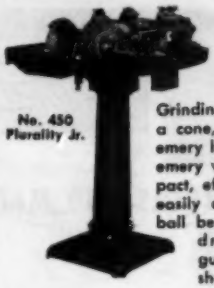

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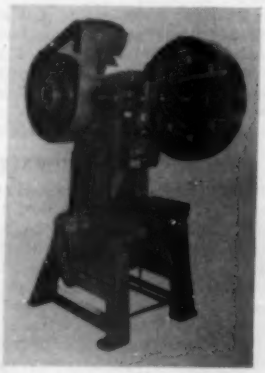
To accompany the film kit is a 16-page booklet in color (6 by 9 in. in size) containing the same illustrations shown in the film. It may be used to review the film after it is shown.

The new film kit (DR-9015K) and film booklet (DR-9015) have been designed for use by students of auto mechanics, shop mechanics, or civic groups who wish to learn in simple nontechnical terms the basic function of the electrical units making up the charging circuit. The film kit may be borrowed and returned after each showing, or may be purchased. The film booklets are available in limited quantities without charge.

(For Convenience Circle Index Code 0708)

NEW 37-TON BACKGEARED PRESS

The Press-Rite Division of Sales Service Machine Tool Company, have announced a new 37-ton open-back inclinable backgeared press. Operating at approximately 45 strokes per minute, the new press is ideal for dial feed or other automatic feed equipment which may be added while at the factory or after the press is instalied.



37-Ton Backgeared Press

Designed for drawing parts and other backgeared applications, the new press has heavy reinforced Unicast alloy frame, 3¼-in. diameter crankshaft with bronze main bearings, roller bearings in the flywheel, and on the back shaft the press has 14 by 25-in. bolster.

The standard stroke is 2½ in., and, if desired, can be arranged for up to 4-in. stroke. The standard shut height is 10 in., and the press may be arranged for shut height up to 20 in.

An interesting new feature of the Press-Rite 37-ton backgeared press is that the back shaft bearing supports are an integral part of the frame. This type of construction provides for greater strength and longer life.

Additional information may be had upon request.

(For Convenience Circle Index Code 0709)

ELMER'S NONFLAMMABLE CONTACT CEMENT

The Borden Company's Chemical Division has developed "Elmer's Non-Flammable Contact Cement" and a companion solvent which make the application of plastic laminates simplicity itself. To help guide the do-it-yourself fan, Borden technicians have devised a simple six-step method for such applications. Described as "fool-proof," the method is said to insure professional results.

Tools and materials needed include a fine-tooth saw, small coping saw, square edge file,

(Continued on next page)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

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This kit will perform the job of teaching the theory of resistors and theory of the Neon Bulb.

The completed project will be valued by the student for electrical repairs around the home and electrical troubleshooting on his automobile.

This tester will do the following: 1. Estimate voltage in a circuit. 2. Determine whether AC or DC current is being used. 3. Determine polarity of an electric outlet. 4. Test continuity in a circuit. 5. Check spark-plug operation in an automobile.

Special School price 50¢ per kit

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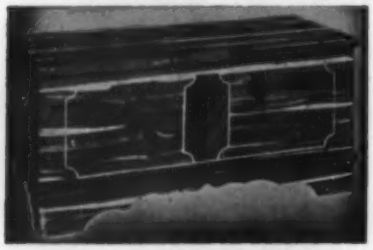

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SHOP EQUIPMENT NEWS

(Continued from previous page)

hand roller or rolling pin, heavy wrapping paper, the plastic laminate of your choice and a clamp-type metal rim or wood molding.

These plastic laminates can be applied to old or new furniture, with relative ease and little expense, and are both fire and explosion proof.

For further information on how to use this product, write to the Borden Company.

(For Convenience Circle Index Code 0710)

MASONS' WOOD LEVELS

The Columbian Vise & Mfg. Company announce their new line of 48-inch Masons' Wood Levels, which feature "Easy-Read," no glare oval lenses.

Available in either kiln-dried sugar pine or genuine mahogany, the levels have 6 metallic-sealed vials (4 plumbs and 2 levels). They are offered in both plain and brass bound types, with finger grips or open hand grips as preferred.

Each level is packaged in a Columbian Certified Levelpack carton. The latter now has a new shock-proof liner which provides protection for the most distant shipments.

Further information is available. Ask for Bulletin LL-5014.

(For Convenience Circle Index Code 0711)

A NEW SERIES OF FILMSTRIPS

Jam Handy Organization announces a new series of six filmstrips in full color, "Autumn Is Here." The six new features have a combined total of 132 illustrations of the many fascinating changes that occur in the world around us when the goldenrod is yellow and the leaves begin to turn.

The individual filmstrips in the series are: Birds Get Ready for Winter; Insects Get Ready for Winter; Seeds Travel; Animals Get Ready for Winter; Plants Get Ready for Winter; and People Get Ready for Winter.

The documentation is planned for easy comprehension by primary children. Planned curriculum areas for the new material are science, nature study, and social studies. A preview is offered by the producer.

Further information may be obtained from Jam Handy Organization.

(For Convenience Circle Index Code 0712)

IMPROVED WELDING AND CUTTING OUTFIT

Linde Company, Division of Union Carbide Corporation, have introduced an improved model of their popular Prest-O-Lite No. 420 Welding and Cutting Outfit capable of welding up to ⅜ in., and cutting up to 2 in.

This outfit includes the performance proved Prest-O-Lite No. 420 Blowpipe which welds, cuts, heats, and brazes without a cutting attachment. However, some changes now make the blowpipe even easier to use. For example,

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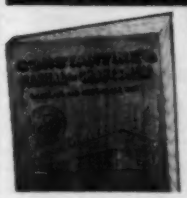

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Besides the No. 420 Blowpipe and R-412 and R-413 Regulators, the new model Prest-O-Lite No. 420 Welding and Cutting Outfit includes: four interchangeable tips (3 welding, 1 cutting), 12½-ft. length twin hose goggles, friction lighter, wrench, and complete instructions.

Further information may be obtained upon request.

(For Convenience Circle Index Code 0713)

NEW IMPROVED SPEEDHONE

Barrett Equipment Company announces their new improved Speedhone, with replaceable Universal stones, which will not fly apart when pulled from a cylinder while being driven by an electric drill or drill press. Universal joint action is in the honing head and a flexible drive shaft is available for special applications. The specially designed hone body provides support for spring arms throughout the honing range . . . and the three selective pressure positioning holes, shown at A, permit the operator to position the spring arms for correct pressure on the stones. Micrometer tension adjustment, shown at B, increases hone stone life. Performance range 11/16 in. to 2 in. Replacement stones are low in cost.

New Improved Speedhone

Recommended for industrial applications such as cleaning grit and burrs from taper, blind, and straight bores.

Details furnished on request.

(For Convenience Circle Index Code 0714)

NEW DIE-LAYOUT MACHINE

Television's unwavering eye today is helping Aluminum Company of America produce huge, costly dies with a degree of accuracy not possible heretofore.

At Alcoa's Cleveland works, the broad screen of a 17-inch TV receiving set glows from the control platform of a newly developed die-layout machine. The set flashes pictures beamed by three cameras that are trained on finely calibrated scales. With this assist from television, the operator can check to a thousandth of an inch, the machine's position as it locates dimension points on a hardened steel die block. Dies so large they were considered impossible a decade ago, now are produced to extremely close tolerances.

The die-layout machine was developed by Alcoa and Consolidated Machine Tool Divi-

(Continued on next page)

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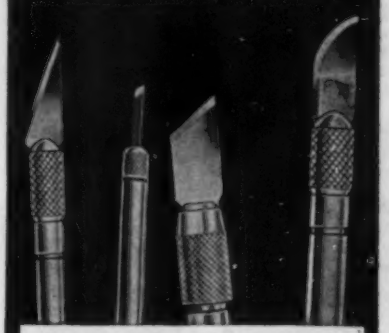
X-acto KNIVES



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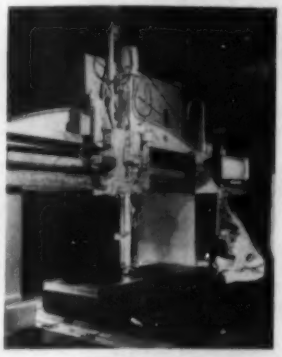
SHOP EQUIPMENT NEWS

(Continued from previous page)



New Die-Layout Machine

sion of Farrel-Birmingham, Inc. It was created to simplify a painstaking, manual operation.

Further information may be obtained upon request.

(For Convenience Circle Index Code 0715)

RE-FIL-IT NYLON MACHINIST BRUSH

The Howell Device Company have announced their Nylon Re-Fil-It Brush Tool, shown in the illustration. Its over-all length is 7⅝ in., width 4 in., thickness of handle ⅝ in., and the polyethylene block is 1 in.

Re-Fil-It Nylon Machinist Brush

thick and 3¼ in. long. The du Pont Nylon "Tynex" bristles are stapled into the block which has a full ½-in. depth to insure a tight hold of the 64 bristle tufts in 5 rows. Bristles are black or white, .014 diameter. Other gauges are available.

The entire brush can be boiled or sterilized, and will stand autoclaving.

If the brush gets "caught in the machinery," as is sometimes the case, the brush being softer, will "chew up" rather than the machinery.

The Nylon Re-Fil-It Refill Head sweeps a path 4 in. broad, and 1 in. the narrow way.

For more detailed information write to the manufacturer.

(For Convenience Circle Index Code 0716)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION.

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READER'S SERVICE SECTION

INDEX TO SHOP EQUIPMENT

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Code No.		Page No.
90	**Adjustable Clamp Company** ..... Jorgensen and pony clamps.	10A
91	**Allied Radio Corp.** ..... Electronic supplies for schools. Free catalog.	45A
92	**Alvin & Company** ..... 1957 catalog complete line drafting supplies	37A
93	**American Air Filter Co.** ..... Dust control for school shops.	17A
94	**American Gas Furnace Co.** ..... Heat treating equipment.	50A
95	**American Technical Society** ..... Publishers	42A
96	**Armstrong Bros. Tool Co.** ..... Tool holders.	16A
97	**Atlas Press Company, The** ..... Precision machine tools.	5A
98	**Bedford Lumber Co.** ..... Knockdown cedar chest & aromatic red cedar lumber.	46A
99	**Bennett Co., Inc., Chas. A.** ..... Publishers.	44A
910	**Bergen Arts & Crafts** ..... 100 page catalog and "How To" book.	50A
911	**Berger Scientific Supplies Corp.** ..... All-in-one drafting kits.	31A
912	**Better Light Better Sight Bureau** ... Lamp making project. Send for free reference folder.	32A
913	**Black and Decker Mfg. Co.** ..... Power-built bench grinder.	9A
914	**Board of Examiners** ..... Teaching positions.	50A
915	**Borden Co., The** ..... Waterproof glue. Contact cement.	38A
916	**Brodhead-Garrett Company** ..... Personal services for planning new shops.	27A
917	**Brown & Sharpe Mfg. Co.** ..... Precision tools.	33A
918	**Bruce Publishing Company** .....3rd cover Texts.	
919	**Can-Pro Corporation** ..... Shop aprons.	37A
920	**Castolite Co., The** ..... Fiberglas and liquid plastics.	39A
921	**Chilton Company** ..... Automotive Library	43A
922	**Cincinnati Grinders, Inc.** ..... Universal grinders.	7A
923	**Cincinnati Tool Company** ..... Complete line of tested tools.	44A
924	**Columbian Vise & Mfg. Co.** ..... Woodworkers vises.	14A
925	**Constantine & Son, Inc., Albert** .... National woodworking contest for craftsmen.	49A
926	**Cope Plastics, D. W.** ..... 1957 plastics catalog.	45A
927	**Copper Shop, The** ..... Enamel-on-copper idea book.	50A
928	**Craftsman Wood Service Co.** ..... Catalog of wood and woodworking equipment.	43A
929	**Cunningham Co., M. E.** ..... Safety wedge grip letters and figures.	10A
930	**Delta Power Tool Div. Rockwell Mfg. Co.** ..... New! School shop textbooks.	47A
931	**Designers Company** ..... Castings for school projects.	50A
932	**Dietzgen Company, Eugene** ....2nd cover Drafting, surveying & printmaking equipment.	
933	**DonJer Products** ..... Free catalog on pre-tested new ideas for school shops.	48A
934	**Douglas Fir Plywood Assn.** ..... Fir plywood.	12A
935	**Driscoll & Co., Martin** ..... Inks.	50A
936	**Electric Hotpack Company, Inc.** ..... Metal enameling kiln.	44A
937	**Electronic Instrument Co. (EICO)** .... Electronic kits and instruments.	40A
938	**Foley Lumber Company, T. A.** ..... Lumber for schools.	50A
939	**Formit** ..... Tools and materials for making hand wrought iron work.	45A
940	**Gaston Finishes** ..... Wood finishes and supplies.	50A
941	**General Finishes Sales & Service Co.** Wood finishing with Seelocell process.	47A
942	**Gilbert & Miller, Inc.** ..... Ideas for approved project activities.	46A
943	**Giles and Kendall Co.** ..... Knockdown cedar chests & aromatic red cedar lumber.	48A
944	**Greenlee Tool Co.** ..... Auger bits and tools. Woodworking calculator — 25¢	16A
945	**Hamilton Manufacturing Co.** ..... Arts and crafts equipment.	25A
946	**Hammett Company, J. L.** ..... Handicraft supplies. Free Catalog.	46A
947	**Hardwood Corp. of America** ..... School shop lumber.	38A
948	**Hays Hardwood Lumber Co.** ..... Domestic and foreign shop and furniture lumber.	48A
949	**Higgins Ink Co., Inc.** .....31A Inks.	
950	**Hossfeld Manufacturing Co.** ..... Universal iron bender.	24A
951	**Indianhead Archery & Mfg. Co.** ..... Archery and leather kits. Send 10¢ for catalog.	50A
951	**Industrial Arts Supply** ..... Voltage tester kit.	48A
953	**Johnson Gas Appliance Co.** ..... No. 133 Forge furnace.	41A
954	**Kassel & Co., L. H.** ..... Lamp parts and electrical supplies.	46A
955	**Kester Solder Company** ..... Flux core solder.	40A
956	**Larson Co., J. C.** ..... Leathercraft and metalcraft catalog.	49A
957	**LeBlond Machine Tool Co., R. K.** .....4th cover Complete line of Lathes.	
958	**Linde Co., Div. Union Carbide Corp.** Now easy method for copper enameling.	6A
959	**Logan Engineering Company** ..... Lathes.	2A
960	**Machine Shop Project Service** ..... Complete kits.	46A
961	**Mayline Co.** ..... Drafting and art furniture.	31A
962	**McKnight and McKnight** ..... Publishers	29A

(Index continued on next page)

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION — September, 1957
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984	**Sales Service Machine Tool Co.**..... Keller power hacksaws.	41A
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992	**Simonds Saw & Steel Co.**..... Si-clone saws.	22A
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994	**South Bend Lathe Works**..... Lathes.	1A
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997	**Stanley Tools**..... Tools.	21A
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THE BRUCE PUBLISHING COMPANY 709 Bruce Building, Milwaukee 1, Wis.

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(as visualized by Tom the Trainee)

"BORING THE WORK"

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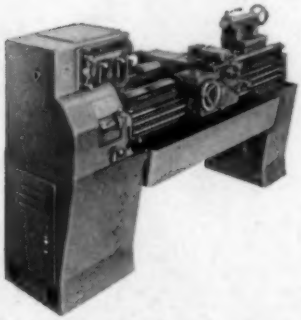
You get *both* lead screw and feed rod on the Regal for accurate thread-chasing, dependable feeds. Foolproof selection of 48 feeds and threads is yours with the new automatically lubricated quick change box. The Regal's new 12-speed headstock with combination gear belt drive gives smooth power throughout the entire range. Hardened and ground replaceable steel bedways are fitted to LeBlond compensating vee-way principle for better distribution of cutting forces. Life-long sturdiness and protection from dirt are built into the double-walled, one-piece apron.

You're sure of teaching the latest big-lathe practice with LeBlond Regal Lathes. You give shop students the up-to-date training they will need to step into competitive modern industry. Regals are available in 13", 15", 17", 19", 21", 24" sizes. Also a 13" bench model. Have your LeBlond dealer demonstrate these new Regal features to you or write for Bulletin R-201 L.



The R. K. LeBlond Machine Tool Company

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